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CHEMICAL EXAMINATION OF THE BARK OF THE ROOT OF EUONYMUS ATROPURPUREUS.

By Wm. T. Wenzell.

Physical Characters.—The bark is of a whitish color, excepting the epidermis, which is streaked with black, is easily pulverized, giving a mealy powder. The parenchymatous tissue cut into thin sections was found to be composed of pentagonal cells running longitudinally with the root, and filled with numerous starch granules. These granules were found on comparing with measured starches to vary from $\frac{1}{10,000}$ to $\frac{1}{5000}$ of an inch in diameter. Their form was spherical, apparently somewhat flattened, the hilum occupying the centre, with its concentric rings just visible, with a magnifying power of 400 diameters.

Preliminary Examination.—A cold infusion of the bark is not changed by perchloride of iron, it is rendered turbid by heat, is precipitated by bichloride of mercury and infusion of galls. Acetate and subacetate of lead give copious precipitates. phospho-molybdic acid gives a precipitate. Trommer's test indicates *Glucose.*

An alcoholic tincture deposits on spontaneous evaporation a substance like wax, soluble in ether and chloroform, but insoluble in alcohol. The tincture is precipitated by salts of lead.

A decoction is colored blue by iodine, and if concentrated deposits crystals.

Course of Analysis.—A quantity of the bark was percolated with 95 per cent. alcohol, and the resulting tincture set aside for future examination. The bark exhausted with alcohol, after being dried, was subjected to the action of cold water by per-

colation. The solution thus obtained was heated and filtered to separate albumen, and evaporated to a semi-syrupy consistence, when a granular whitish deposit took place. This deposit was sparingly soluble in water, very soluble in dilute nitric and hydrochloric acids; a portion of the nitric solution tested with oxalate of ammonia gave indications of lime, and gave precipitates with nitrate of silver and chloride of barium. Acetate of lead gave a precipitate very soluble in citrate of ammonia, but insoluble in ammonia. Its hydrochloric solution treated with ammonia and boiling, gave a precipitate, which, on dissolving again in the acid, and treating as before, caused again a precipitate. The granular deposit was therefore *Citrate of Lime.*

The solution, after separation of citrate of lime, was diluted with water and then treated with acetate of lead as long as a precipitate was obtained. The washed precipitate suspended in water, was decomposed by a stream of hydrosulphuric acid. The acid solution which was obtained, on being neutralized with ammonia and mixed with chloride of calcium, afforded a precipitate of *tartrate* of lime, recognized by its behaviour towards solutions of soda and potassa, and by the sparingly soluble salts of potassa and ammonia. To the filtrate after the separation of tartrate of lime, more chloride of calcium was added and mixed with an excess of alcohol, when a bulky precipitate subsided. This precipitate was dissolved in acetic acid, and again precipitated by acetate of lead, to which a little ammonia was added, and the washed precipitate decomposed as before. One half of the acid solution evaporated to dryness, and heated in a glass tube, first melted and then decomposed with the formation of a crystalline sublimate, which possessed strong acid properties, very soluble in water and alcohol, precipitated by acetate of lead and barytic water. The other half of the solution was divided into two equal parts, one of which was exactly neutralized with ammonia and evaporated, when it was left as a deliquescent uncrystallizable salt. On dissolving the salt again in water, and adding the other remaining half of the acid, a less soluble bi-salt, consisting of acicular crystals is obtained. The acid under examination is therefore *Malic Acid.*

The liquid, after the action of neutral acetate of lead, was treated with subacetate of lead, and the washed precipitate de-

composed as before. The liquid obtained possessed a strong acid reaction, and deposited on boiling oblique prismatic crystals, which, on examination, proved to be a salt of lime. This salt of lime after solution in water was again treated with acetate of lead and again decomposed. A portion of the acid solution now free from lime, on being mixed with ammonia and chloride of calcium, and boiling, produced no change; on mixing, while yet warm, with 95 per cent. alcohol, after a short time, crystals were formed. These when examined by the microscope were shown to be long, thin, needle shaped, and curved, unalterable in air, and very soluble in water. The acid solution, on being evaporated and allowed to stand in a warm place, crystallized in beautiful prismatic crystals. It is to be regretted, that owing to the limited quantity of material at command, the chemical properties of this new organic acid could not have been more thoroughly investigated. This acid may be called *Euonic Acid.*

The solution remaining after the action of the subacetate of lead was freed from lead by hydrosulphuric acid, and passed through prepared animal charcoal, and then placed in a warm place for spontaneous evaporation, when in due time a crystalline deposit was obtained. This deposit was dissolved in water, and the solution treated with twice its volume of 95 per cent. alcohol, and the precipitate which fell collected on a filter and washed with alcohol. The precipitate was acted upon by water, which took up a portion of it, consisting of *chloride of potassium* and *sulphate of potassa*, while the insoluble part was found to consist of *phosphate of lime.*

The alcoholic solution, after separating the above inorganic salts was evaporated carefully, adding some water, and set aside for two or three days, when crystallization was effected. The crystals were drained on bibulous paper and dried. They were again dissolved in water and recrystallized. The crystals obtained were colorless rhombohedral prisms, soluble in about 60 parts of water, and freely soluble in boiling water, and neutral to test papers. On mixing its solution with one of ammoniacal acetate of copper, a beautiful azure blue precipitate is obtained. Solution of ammoniacal acetate of lead gives a voluminous white precipitate. On heating the crystals on platina

foil, they first fused, giving off vapors of water, and puffed up into a spongy coal, combustion being effected without residue. When treated with sulphate of potassa in the cold, or boiling with hydrated oxide of lead, combination was readily effected with the evolution of ammonia. On decomposing the compound of lead, the liberated acid, which possessed but little taste, was not precipitated by the salts of lead and silver, and on evaporation it was obtained as a colorless powder, composed of minute prismatic crystals, which yield ammonia on being decomposed by heat. There is no doubt of its identity with *Asparagin*.

The remnant of the solution was evaporated and heated to incineration. The ashes gave on analysis *Lime* and *Magnesia*.

The alcoholic tincture when allowed to evaporate spontaneously, yields an oily substance, from which, when treated with sulphuric ether, the oil is dissolved and a soft resin left. The oil on being purified by washing with alcohol, was left of a yellowish color and bland oily taste, possessing the properties of a fixed oil. The tincture thus freed from the fixed oil and neutral soft resin, was treated with an alcoholic solution of acetate of lead; the washed precipitate suspended in alcohol, decomposed, and the filtrate passed through prepared animal charcoal. The colorless solution reddened litmus paper strongly, and gave, with acetate of lead, nitrate of silver, and barytic water, white precipitates. Ammoniacal sulphate of copper gave a bluish white precipitate. A concentrated solution deposited on the sides of the vessel confused masses of prismatic crystals. The resin is very fusible, burning with bright flames, is tasteless and inodorous, soluble in alcohol, ether and chloroform; a drop of the solution placed under the microscope, and allowed to evaporate, exhibited a group of prismatic crystals, radiating from its central point. It combines readily with alkalies forming salts, very soluble in water. The solution, after the separation of the last resin, was set aside about two weeks, when a deposit formed on the sides of the vessel. This was first malaxated with water, then dissolved in ether, and the ethereal solution evaporated. A resin was left of a golden yellow color, which exhibited no tendency to crystallize, and having an acid reaction. Its solution in alcohol gave with baryta an orange-colored precipitate, sulphate of

copper gave a bluish, and acetate of lead and nitrate of silver yellowish white precipitates. The resin is fusible and combustible. That portion of the deposit not acted on by ether proved to be likewise a resin; it was pulverizable, of a brown color and bitterish taste, and its solution was precipitated by acetate of lead.

The liquid, after the separation of the several resins, was mixed with water in all proportions without causing a precipitate. It gave precipitates with phospho-molybdic acid, and subacetate of lead, and still possessed the bitter taste of the bark. It was evaporated to expel the alcohol, and the aqueous solution passed through prepared animal charcoal, which removed the bitter principle. The decolorized solution was evaporated to a syrupy consistence, when, after a few days' repose, crystals of asparagin were deposited. The liquid also gave indications of grape sugar.

A portion of the bark, after exhaustion with cold water, was treated with a cold and weak solution of carbonate of soda, and the filtrate acidulated with hydrochloric acid without causing any precipitate; another portion of the bark was treated with the solution at a temperature 170° Fahr.; on acidulating a portion of the filtrate, a gelatinous precipitate was obtained; another portion treated with chloride of calcium gave an insoluble precipitate. From this it appears that *pectin*, not pectic acid is present.

One hundred grains of the dried bark gave by incineration 14·75 grains of ashes, 1·19 of which were soluble in water. 5·94 grains were soluble in hydrochloric acid, and gave on analysis, lime, magnesia, oxide of iron, phosphate of iron, and phosphate of alumina. The insoluble silicious residuum was not examined.

A tincture of the bark was prepared with dilute alcohol and agitated with chloroform. The chloroformic solution or layer was carefully drawn off, and allowed to evaporate spontaneously, which left a dark, yellow substance, having the taste of the bark in an eminent degree, reddening litmus paper, very soluble in alcohol and chloroform, but partially soluble in ether. On subjecting it to the action of ether, this dissolved the substance to

which the acid reaction was due, and on evaporation there was left the golden yellow resin already described.

The part left after the action of ether was dissolved in alcohol, and treated with a solution of acetate of lead, to precipitate some other resin, and the filtrate deprived of lead by hydrosulphuric acid. The colorless solution thus obtained possessed an intensely bitter taste. It is abundantly precipitated by subacetate of lead; phospho-molybdic acid caused a flocculent whitish precipitate. It is soluble in water, ether and alcohol, and is not crystallizable. It is a neutral body, possessing neither acid nor alkaline reaction. It is reddened by strong nitric acid, and converted into a substance possessing acid properties. Sulphuric acid dissolves it without production of color. Both acids destroy the bitter taste of the principle Euonymin.

From the foregoing analysis, the bark of Euonymus Atropurpureus may be said to contain the following constituents:

Organic Constituents Uncombined.—Euonymin, Asparagin, Soft Resin, Crystallizable Resin, Yellow Resin, Brown Resin, Fixed Oil, Wax, Starch, Albumen, Glucose, Pectin.

Organic Acids in Combination with Lime and Magnesia.—Malic Acid, Euonic Acid, Citric Acid, Tartaric Acid.

Inorganic Salts.—Phosphate of Lime, Sulphate of Potassa, Chloride of Potassium, Sulphate of Lime, Phosphate of Iron, Phosphate of Alumina, Oxide of Iron, Silicious Residue.

La Crosse, Wisconsin, July 15th, 1862.

ON THE PREPARATION OF IODIDE OF AMMONIUM.

By Wilson H. Pile, M. D.

There are two methods of preparing this article usually given by chemical writers. One is, to proceed as in making iodide of potassium, first forming an iodide of iron, and then by the addition of ammonia, throwing down the sesqui-oxide of iron and leaving the iodide of ammonium in solution. Made in this way, the product is generally dark colored. The second and more preferable method is by first making hydriodic acid and then saturating it with ammonia. The objection in this latter case is the necessity of first preparing the acid, a very disagreeable process, involving the use of sulphuretted hydrogen

gas, which would no doubt deter the generality of pharmaceutists from attempting it.

In the method here proposed, the above objections are avoided, and by following the directions a pure salt is easily obtained. The formula is based upon the fact of the insolubility of bi-tartrate of potassa, which is thrown down when iodide of potassium and bi-tartrate of ammonia in concentrated solutions are mixed together.

Thus, $KI+NH_3,2C_4H_2O_5+HO=NH_4I+KO,2C_4H_2O_5$.

The first step of the process is the formation of the bi-tartrate of ammonia; the second, its double decomposition by means of iodide of potassium, and finally the separation of all traces of bi-tartrate of potassa from the resulting salt.

The detail of the whole process is as follows: Dissolve 300 grains of tartaric acid in 3 ounces of water, and saturate accurately with water of ammonia (about 14 fluidrachms.) The bi-tartrate of ammonia copiously thrown down at first, redissolves as the solution becomes neutral to a test solution of litmus; 300 grains more of tartaric acid is now to be added and the mixture raised to boiling. A solution of 662 grains of iodide of potassium in an ounce and a half of water is now to be stirred in, and the boiling continued for a few minutes longer; then set aside for several hours, filter, and when all the liquid has passed through, pour on the filter 2 ounces or more of cold water, until the filtrate has but little saline taste. Now evaporate all the filtered liquid until it begins to thicken, and while yet warm, pour on a mixture of 2 ounces of alcohol and ½ ounce water; this alcoholic liquid readily dissolves all the hydriodate of ammonia, but leaves a small quantity of cream of tartar.* After being allowed to settle, the clear solution is to be decanted off, the residue washed with a little more alcohol and water, and finally the whole evaporated at a gentle heat to perfect dryness.

The resulting salt, which while yet moist appears like brown sugar, becomes at last nearly white. It is inodorous, very de-

*In the present case the weight of cream of tartar thus separated amounted to 13 grains.

liquescent, and, which is a test of its purity, totally volatilized with decomposition by heat, with evolution of iodine vapors.

The yield of several trials from the above quantities was 545 grains; theoretically there should have been 576 grains. Possibly the iodide of potassium employed was not entirely pure. The collected and pure cream of tartar was about 700 grains.

REMARKS ON UNGUENTUM MEZEREI.

By Richard B. Sheriden.

(Extracted from an Inaugural Essay.)

My attention has been directed principally to this preparation, on account of the difficulty which every pharmaceutist experiences, in endeavoring to prepare it as directed by the Pharmacopœia. The objections to the mode of preparation therein directed, are briefly as follows:—

1. The time required in its preparation, as, owing to the affinity of fatty bodies for oxygen, it is impossible to keep lard in a melted condition for such a length of time without materially affecting the product.

2. The difficulty of bringing the bark to a proper condition to yield its virtues to the lard and wax used.

3. The unsatisfactory appearance of the ointment.

4. The variation in strength, and consequent uncertainty of its operation.

In view of these objections, I made experiments in order to present a more eligible formula, for the preparation of the above mentioned ointment.

Experiment 1. Four ounces of the chipped bark was moistened with strong alcohol, and after standing 48 hours, was transferred to a percolator, and alcohol added until the bark was exhausted. This tincture was evaporated to the consistence of an extract, which weighed half an ounce. This was of a brownish green color, and possessed of the characteristic odor of the bark.

Experiment 2. An extract was prepared by treating 4 ozs. of the bark with ether, in the same manner as in the foregoing experiment. This extract was of a pale green color, and possessed the same odor as the alcoholic extract. It weighed 3 drachms.

Experiment 3. One drachm of the alcoholic extract was dissolved in one ounce of ether. This solution was thrown upon a filter, and after filteration and evaporation yielded an extract, weighing 29 grains, and resembling the alcoholic extract in appearance.

Experiment 4. Four ounces of the chipped bark was macerated with strong alcohol, and afterwards put into a percolator, and alcohol added, until 3 ozs. of tincture had passed. This was set aside and the percolation continued, until the alcohol came through colorless. The resulting liquid was evaporated to one fluidounce, and added to the three ounces previously obtained, thus making a fluid extract of the strength of an ounce of the bark, to a fluidounce of the extract.

Ointments were prepared from each of these extracts. The first was made from the alcoholic extract. This ointment, though of a satisfactory color, was objectionable on account of the specks of extract, which could not be thoroughly incorporated with the simple ointment used, without the expenditure of much time and trouble, in which respects it has but little advantage, save that of color, over the officinal ointment.

The ointments prepared from the ethereal and ethereo-alcoholic extracts, were liable to the same objections. So far, therefore, I obtained no ultimate advantage from the preparation of these extracts, in so far as they related to the manufacture of an ointment, which I wished to render unexceptionable.

Finally, however, I prepared an ointment from the fluid extract, which fully realized my highest expectations. The advantages of this ointment over the officinal, and those prepared from the solid extracts, are its uniform consistence, the shortness of time required in its preparation, and its highly satisfactory appearance. I would therefore respectfully submit the following:—

Formula for Ung. Mezerei.

℞	Axungiæ	ʒxiv.
	Ceræ Albæ	ʒij.
	Ext. Mezerei Fl.	ʒiv.

The lard and wax having been previously melted together, and stirred until cool, the simple ointment resulting therefrom should be triturated with the fluid extract until thoroughly incorporated.

ON CITRINE OINTMENT.

By John S. Lester.

Editor of the American Journal of Pharmacy.

Dear Sir,—Being aware that there have been a great many suggestions made at different times, as to the mode of preparing Ung. Hydrargyri Nitratis, and that there still exists much doubt as to the eligibility of many of the formulas, either in this or other countries, I take the liberty of handing you the following formula, which I have used several years with better success than from any other. It may not be new, but if you should find upon examination that any advantages are to be gained, you are at liberty to publish it. The advantages which I believe it possesses over others are, the production of a most beautiful ointment, both in color and softness, the retention of the latter quality for any length of time when kept from the light, and in avoiding the loss of acid which takes place in dissolving metallic mercury in the officinal process. I should be pleased to have your opinion* as to what difference, if any, follows the use of red oxide of mercury, instead of metallic mercury.

Take of Red oxide of mercury an ounce.

Commercial nitric acid (sp. gr. 1·38) three ounces av.

Prepared lard,

Olive oil, (best) each seven ounces.

White wax, half an ounce.

Dissolve the oxide of mercury in the acid by the aid of a gentle heat, melt the lard and wax in the oil by a moderate heat in a vessel capable of holding about six times the quantity, and while the mixture is hot, add by degrees the mercurial solution also hot, and if the mixture does not froth up, apply more heat until it does, then stir constantly until cool after removing from the fire.

Appleton, Wisconsin, July 14, 1862.

[* The result will depend entirely on the strength of the acid and the mode of proceeding. When the officinal directions are followed the mercurial salt is a mixture of proto-nitrate and per-nitrate of mercury with free nitric acid. In the above recipe per-nitrate only exists with excess of nitric acid. If the nitric acid used is strong, the ointment will be more active than the officinal; if weak it may be less active. We find no difficulty in using the officinal process and materials.—Editor Am. Journ. Ph.]

GLEANINGS FROM THE FRENCH JOURNALS.

By the Editor.

Senecio doronicum substituted for Arnica.—M. Timbal Lagrave, of Toulouse, states (Rep. de Pharm., Mai, 1862,) that an herb gatherer of that city has been furnishing the herb of Senecio doronicum for arnica, and points out the means of distinguishing them from each other.

On Aribine, a new organic base.—M. Rieth has extracted this body from the bark of *Arariba rubra*, a tree growing in the virgin forests of Eastern Brazil. This tree, according to M. Martius, approaches the Cinchonaceæ. The bark is characterized by the red color of its internal layers, and is employed by the Indians for dyeing wool red. A new alkaloid has been extracted from it which has received the name of *aribine*. The process is as follows:—The bark in small fragments is digested in dilute sulphuric acid. The united liquors are filtered, evaporated to one-tenth, neutralized by carbonate of soda, and precipitated by an excess of acetate of lead. After filtration, the solution is treated by sulphuretted hydrogen, filtered and precipitated by an excess of carbonate of soda.

The whole is now agitated with ether, which dissolves the base and rises to the surface. The ethereal liquid is then agitated with a slight excess of hydrochloric acid, which extracts the aribine, and separates as a crystalline precipitate insoluble in ether. To get the alkaloid pure, the salt is again precipitated and crystallized from ether. Aribine presents the form of large anhydrous rhomboidal octohedrons, and also occurs in long, thin, hydrated prisms, which effloresce in the air.

Deposited from boiling ether the crystals are anhydrous, whilst from ether by spontaneous evaporation the crystals contain 29·03 per cent. of water or 16 equivalents. Its taste is very bitter, though but little soluble in water. It has an alkaline reaction, and melts at 229° C. without decomposition. Dry, it absorbs hydrochloric acid with disengagement of heat. The chlorohydrate crystallizes in briiliant prisms, soluble in water, and insoluble in hydrochloric acid. Alkalies precipitate the base in the form of a white substance, which becomes crystalline when heated. Chloride of potassium forms with the hydro-

chlorate a double salt. Tannic acid does not precipitate the base.

It is remarkable that aribine does not contain oxygen; its composition is expressed by the formula C_{46} H_{20} N. It is consequently the first instance of a solid non-oxygenous organic base in nature.—*Repert. de Pharm. Mai*, 1862.

Falsification of Balsam of Copaiba.—M. Reveil has examined a specimen of copaiba taken by l'Ecole from a druggist. This balsam is remarkable for its terebinthinate odor, is solidifiable by magnesia, and nearly completely soluble in absolute alcohol; but ammonia solidifies it immediately, whilst it troubles but momentarily the pure balsam of copaiba of the Central Pharmacy, and gives with Para balsam an emulsion of slight consistence. A mixture of Para copaiba and turpentine is also solidified by ammonia.—*Jour. de Chim. Med.*

Vanilla at Reunion.—It was only between 1840 and 1844 that this culture was commenced. The events which followed the revolution of 1848 caused its neglect, and during the following ten years the product was small. It is only since 1857 that this culture has received a greater development. Unhappily for the producer, the price has followed an inverse ratio,—falling as the produce increased, not from a degeneration of quality in the vanilla, but from excess in the market.

Here is a table of exportation and the mean prices of vanilla at Reunion from 1857 to 1860:

1857,	exported	1200	kilograms	sold at	150 to 170	francs per kil.
1858,	"	2009	"	"	200 to 250	"
1859,	"	3000	"	"	160 to 200	"
1860,	"	6000	"	"	66 to 100	"

It is a subject of inquiry at Reunion at this time to find a market for vanilla, and it is proposed to send some of it to China where they think this article will be sought for.—*Repert. de Pharm.* from *Ann. de l'Ag. des Colonies.*

Characteristics of the purity of Chloroform. By M. Hardy.—If a little fragment of sodium is thrown into chloroform, it remains intact if the chloroform is pure.

When this anæsthetic agent contains alcohol or other sub-

stance capable of alteration, gas is produced. In most cases these gases are hydrogen, marsh gas, or carbonic oxide; they are entirely formed of hydrogen and carbonic oxide if the foreign substance is wood spirit. This reaction occurs in the cold and nearly instantaneously.—*Rep. de Pharm.*, Av., 1862.

Opium altered by age.—In his memoir on opium, M. Guibourt states, that in analysing an opium kept in his store nearly twenty years, he obtained less morphia than he had extracted from the same opium when recent. The product obtained was strongly colored, and the alcoholic solution equally so. The extractive matter, (says the professor,) and other principles without doubt, the morphia, perhaps, is converted into a brown body (apotheme?) little soluble in water, but soluble in alcohol like morphia, and precipitating with it by the cooling of the liquid, and can only be separated by combining the alkaloid with an acid, and decolorizing the salt by charcoal, &c.—*Rep. de Pharm.* Avril, 1862.

ON THE CLEANING AND PRESERVATION OF ENGRAVINGS.

Augustus A. Hayes, M. D., State Assayer of Massachusetts, says in the *Scientific American*:—

The frequent inquiries addressed to me by those who possess valuable engravings—which have become damaged through accident or exposure—respecting a mode I adopted successfully for restoring some very fine ones, induce me to publish a general process applicable to the largest number of cases.

Any one who will incur the trouble of looking up in the older print-shops and depositories in residences in this country, will find abundance of defaced engravings of rare merit, the works of the best masters rejected, which can be restored easily to quite their former degree of freshness and beauty. All who have studied the better efforts of the old artists in giving permanency to their conceptions in this department of art, assign to it a very high place, and it may be suggested that a higher cultivation and enjoyment of design and execution, in so far as the influences of light are concerned, may be gained from careful observations of engravings than can result from time be-

stowed on paintings which often command public admiration, or are the so-called gems of an exhibition.

In commencing to restore an engraving, some attention must be given to the kind of injury it has suffered. A general brown color, more or less deep, resulting from atmospheric action only, is the least possible change. Spots and stains caused by ink, colored fluids, oil or insects must be first treated, and all pencil marks removed by india-rubber or bread crumbs. A fluid acid, obtained by dissolving one ounce of crystals of oxalic acid in one-fourth of a pint of warm water, may be used for application to all stains, and the paper should be wet with it thoroughly where spots of any kind exist. Excepting in a few cases, this acid will not cause the removal of stains immediately, but generally it combines with the bases of them, and they are removed by subsequent steps; the thorough wetting should be done a few hours before proceeding to clean the engraving.

To facilitate handling and for the protection of the edges of the paper, a piece of millinet, or the stiff open fabric formerly sold for ladies' skirts, should be roughly sewed around one stick at each end, so as to form an apron, like a chart attached to two rollers, the cloth of which must be an inch larger than the largest print to be handled. From one to ten prints of even large size may be cleaned at one time, after they have been wet on their spotted parts with the acid, and evenly spread on the apron, so as to allow of the immersion of the whole in water. A tub of the ordinary size will allow prints of considerable surface to become immersed, but the most desirable resort is a common bathing vessel, so nearly filled with warm water that the bent paper supported by the open texture can rest on the bottom and sides, where it should be allowed to remain, with occasional raising of it, and moving it by means of the stick handles, from twelve to twenty-four hours.

On the first trial a degree of alarm will be felt in the case of a highly-prized favorite at this seeming careless treatment; but it must be borne in mind that paper is a firmly felted mass of short fibres which may be soaked in various fluids for weeks and resist all diluted acids and most chemical agents for a long time wet, if not exposed to mechanical abrasion by touch or rapid motion. The strong paper of engravings absorbs much air,

which resists the penetration of the water, and motion is necessary to remove this as well as to allow the colored solutions formed to pass away. This motion may be given by holding the supporting sticks and passing the mass from end to end of the bath, or slowly up and quickly down, enabling the sheets to become separated momentarily. Discolored water may be drawn off, the apron and contents resting on the bottom and sides, and fresh water be slowly admitted to replace it. Cold water can be substituted for warm, longer time being allowed for its action. When the prints no longer add color to the water after being agitated, the water must be withdrawn and replaced by such a portion as will barely cover the paper. Half a pound of bleaching powder (chloride of lime) mixed to a paste first in cold water, and then added to two quarts of cold water and well stirred from time to time for six hours, will afford a nearly clear fluid resting on a white deposit in the earthenware vessel. A portion of the clear part of this fluid must be added to the water in the bath, until both taste and odor denote the presence of chlorine in the water. Motion being given to the paper, the bleaching effect of chlorine will be perceived, or its odor in the water will have been lost, when more must be added so that the odor or taste of chlorine must be present in the water two or three hours.

The action of the chlorine on the parts previously wet with the acid will remove nearly every kind of discoloration, while the brown hue of the paper giving place to perfect whiteness, the light and shadows of the engraving become of their original perfectness, and the picture will be as distinct as when it was first impressed. It has happened in a few trials, when the prints were long stained, and they did not yield to the weak chlorine water, that resort was to have a little mineral acid to develope free chlorine in the bath. One ounce of muriatic acid was added to one pint of cold water, and the weak acid thus formed, mixed in the water of the bath, soon caused the bleaching of every fibre in the paper.

After the bleaching the water must be drawn off, the paper drained, fresh clear water admitted, and the paper moved through the water to thoroughly wash away all adhering chlorine. Several quantities of water may be used, the paper being each time drained; and finally, the whole mass, raised by the handles,

may be placed on a clean white wood table or board to drain. If a number of prints have been treated, the wet mass may be placed in a warm room, or air may be admitted, and as the one on the top of the pile becomes more dry than the rest, it may be removed to any support and left to dry. In hastening the drying I have extended ordinary bed sheets and spread the wet prints singly on these, slow drying rendering any pressing unnecessary.

Those having the usual presses might prefer to press the still damp sheets, and where only two or three prints are the subjects of trial, the substitution of other vessels and ready appliances will occur to any one.

This description is given in detail purposely, although unnecessary, so far as the process is concerned, because I wish to impress on the mind of any one who possesses an injured engraving that it can be restored to its original value without the expenditure of much attention; and it must not be the conclusion, from reading this process, that great care is required, for time is insisted on rather than attention. The few dispositions being made, not the slightest care need be given to the matter. If the bath can be spared, the odd minutes of a week will enable one to restore dozens of specimens, and give permanency to their beauties.—*Chem. News*, *July* 26, 1862.

HORSLEY'S TEST (?) FOR STRYCHNIA.

Under this caption Prof. J. E. D. Rodgers, of St. George's School of Medicine, criticizes the article of Mr. Horsley (see pages 433 and 434 of this number) on nitro-prusside of sodium as a test for strychnia, and asserts that Mr. Horsley must have used an impure test, because pure nitro-prusside will not cause such a reaction. Mr. Horsley appears, from his own admissions, according to Prof. Rodgers, (Chem. News, Aug. 2, page 69,) to have used a nitro-prusside solution containing ferridcyanide of potassium! one of the best color tests of strychnia yet known. Mr. Horsley, however, now claims (Chem. News, July 26, page 56) that his impure test owes its intense delicacy not to nitro-prusside or to ferridcyanide, but to some substance which he has not himself identified, and offers to furnish samples of the regent to any chemist interested.—EDITOR AMER. JOUR. PHARM.

CHEMICAL RESEARCHES ON THE SPONTANEOUS DECOMPOSITION OF PYROXYLIN.

By M. S. DeLuca.

The pyroxylin, or gun cotton, employed in this investigation, was bought in Paris in 1859, and preserved, sheltered from the light, in a wooden box, perfectly close, in the Chemical Laboratory of the Faculty of Sciences, at Pisa. It was enclosed in a glass bottle, stopped with a cork and sealed with wax. Its spontaneous decomposition had occurred during the summer of 1860, with disengagement of nitrous vapors.

This decomposed pyroxylin had lost all its original properties. In fact it had a white aspect, a little yellowish at the sides; was pasty and sticky; possessed a strong acid taste, emulsionized with cold distilled water, and the emulsion thus formed passed slowly through filtering paper. The filtered solution, which was limpid, reddened litmus, disengaged nitrous vapors when in contact with copper and sulphuric acid, was colored strongly yellow by ammonia and potassa, reduced the tartrate of copper and potassa, was not colored by an aqueous solution of iodine, became brown when heated with sulphuric acid, and gave a precipitate with an excess of lime water which had all the characters of an oxalate. The solution disembarrassed of the lime precipitate, subjected to a current of carbonic acid gas, and carried to ebullition to separate the carbonate of lime, easily reduced the tartrate of copper and potassa.

The modified gun cotton put under a bell glass, with concentrated sulphuric acid, becomes perfectly white, preserves its acidity, can be reduced to powder under the pressure of the finger, and loses 38 per cent. of its weight. In fact, 5·346 grms. of this cotton left thus in contact with sulphuric acid, from December 22d, 1860, to June 20th, 1861, lost 1·919 grms.

This cotton, when subjected to heat lost weight, as follows:—

Weight of cotton. Grms.	Temperature.	Loss. Total.	Loss. Per cent.
2·352	212° to 230° F.	0·791	33·2
4·328	230° to 248° "	1·632	37·7
2·187	248° to 266° "	0·823	37·6
2·458	266° to 284° "	0.605	41·5
2·187	302° to 320° "	0·914	41·8

Now the 2·352 grms. of gun cotton mentioned have given:—

	Grms.
Water and nitrous vapors from 212° to 230°	0·791
Matter soluble in ether	0.009
Matter soluble in alcohol	0·210
Matter soluble in water	1·227
Matter insoluble in water and alcohol	0·070
Loss	0·045
	2·352

It results from these numbers that the modified gun cotton, after being dried at 230° F., yields to alcohol 14 per cent. of its weight, and to water 78 per cent.; that is to say, nearly the whole of the dry matter, consequently it follows that gun cotton, which is insoluble in water and alcohol, in decomposing spontaneously, can, under the influence of the nitrous vapors which it disengages, give rise to products neutral and acid, soluble in water and in alcohol, and which the author is engaged with at this time.

When the aqueous solution of the altered cotton is evaporated on a water bath, a substance is obtained, which swells in volume and becomes spongy towards the end of the evaporation. This substance is light, white, friable internally, but adhesive where in contact with the air, owing to its hygroscopic tendency. This matter is spongy, it is not soluble in ether, to which, nevertheless, it communicates a slight acidity; neither is it soluble in a mixture of alcohol and ether, but it is partially soluble in alcohol. The matter dissolved by the alcohol reduces easily and abundantly the tartrate of copper and potassa; the insoluble portion left in contact with moist air during 24 hours, assumes the appearance of a dense solution of gum.

The aqueous solution of altered gun cotton, when mixed with eight times its volume of alcohol, gives an abundant flocculent precipitate, which, when washed on a filter with alcohol and dried over sulphuric acid, is amorphous, nearly opaque, friable and with a gummy appearance. It dissolves easily in cold water, and the solution is precipitated by acetate of lead.

Altered gun cotton is attacked by hot nitric acid with the evolution of nitrous vapors, and the production of matters soluble in water, and precipitable by the salts of lead, silver and mercury.

These researches, in which I have been greatly aided by M. Ubaldini, will be pursued for the study of the neutral and acid matters contained in modified pyroxylin.—*Journ. de Pharm., Juin*, 1862.

ON THE NEW METAL THALLIUM.

By M. A. Lamy.

On examining, three months ago, with MM. Kirchhoff and Bunsen's spectrum apparatus, a specimen of selenium prepared by my brother-in-law, M. Fred. Kuhlmann, from the deposits in the chambers in which sulphuric acid was made by the combustion of pyrites, I perceived a sharply-defined green line which I had not observed in any of the numerous simple bodies or mineral compounds which I had studied. I was not then aware that an English chemist, Mr. W. Crookes,* had not only discovered the same green line under almost analogous circumstances, but had given the name of *thallium* to the new element, from the Greek word θαλλος, or Latin *thallus*, frequently employed to express the rich tint of young and vigorous vegetation. Mr. Crookes, with great skill, described several of the reactions of the element, which he considered as a metalloid, probably belonging to the sulphur group; but the small quantity of substance did not permit him to isolate this element and recognise its true nature.

We have endeavored to isolate the new body by seeking for it in the deposits from the leaden chambers whence the selenium had been extracted, which gave us in the spectroscope the characteristic green line. This line has naturally served us as a guide, and has enabled us to prepare perfectly definite crystalline compounds, whence we have extracted thallium,—the first time with the assistance of an electric battery.

Properties of Thallium.—Thallium has all the characters of a true metal, and, in most of its physical properties, greatly resembles lead. Not quite so white as silver, it possesses a brilliant metallic lustre when freshly cut. It appears yellowish when rubbed against a hard body; but this tint is doubtless due

* Mr. Crookes obtained the element in a pure metallic state, investigated its properties and exhibited it to several friends as early as January last, (see paper read before Royal Society, June 19, 1862.)

to oxidation, for the metal precipitated by a battery from an aqueous solution, or fused in a current of hydrogen, is white, with a bluish gray tinge, which resembles aluminium.

Thallium is very soft, and very malleable; it can be easily scratched by the nail, and cut with a knife. It marks paper, leaving a yellowish streak. Its density (11·9) is a little higher than that of lead. It fuses at 290° C., and volatilizes at a red heat. Lastly, thallium has a great tendency to crystallise, for the ingots obtained by fusion crackle like tin when they are bent. But the physical property, *par excellence*, of thallium,—that which, according to the beautiful researches of MM. Kirchhoff and Bunsen, characterises the metallic element,—that which led to its discovery,—is the property which it possesses of communicating to the pale gas-flame a green color of great richness, and to the spectrum of this flame a single green ray as distinct and as sharply defined as the yellow ray of sodium, or the red ray of lithium. On the micrometric scale of my spectroscope, this ray occupies the division 120·5, that of sodium being at 100. The slightest portion of thallium, or of one of its salts, gives the green line with such brilliancy that it seems white. The fifty-millionth part of a gramme can, according to my calculations, be recognised in a compound.

Thallium tarnishes rapidly in the air, becoming covered with a thin pellicle of oxide, which preserves the rest of the metal from alteration. This oxide is soluble, is decidedly alkaline, and has a taste and smell similar to potash. By this characteristic, as well as by its optical properties, thallium approaches the alkaline metals.

Thallium is attacked by chlorine, slowly at the ordinary temperature, rapidly at a temperature above 200° C. The metal then melts, becomes incandescent under the action of the gas, and gives rise to a yellowish liquid, which solidifies on cooling to a mass of a little paler color.

Iodine, bromine, sulphur, and phosphorus can also combine with thallium, forming iodides, bromides, sulphides, and phosphides.

Recently-prepared thallium preserves its metallic lustre in water. It does not appear to decompose this liquid at the temperature of ebullition, but, by the aid of an acid, it separates its elements, disengaging hydrogen.

Sulphuric and nitric acids are those which attack thallium easiest, especially by the aid of heat. Hydrochloric acid even boiling dissolves it very difficultly. Under these circumstances, there form white soluble salts, sulphate, and nitrate, crystallising readily, and a slightly soluble chloride, but capable also of crystallising.

The chloride formed by the direct action of chlorine or by *aqua regia* is deposited from its aqueous solution in the form of magnificent yellow plates, which appear to belong to the rhombohedral system.

Zinc precipitates thallium from its sulphate and nitrate solutions; the new metal deposits in brilliant crystalline plates.

Hydrochloric acid and protochlorides give, with the same solutions, a white precipitate of chloride of thallium resembling chloride of silver, but slightly soluble in water; otherwise, very little soluble in ammonia, and inalterable by light.

Hydro-sulphuric acid has no action on pure neutral or acid solutions; but if they are alkaline, a voluminous black precipitate of sulphide of thallium is produced, which readily settles to the bottom of the vessels, and is insoluble in an excess of precipitant.

Finally, potash soda and ammonia, do not displace oxide of thallium in combination with sulphuric and nitric acids.

Natural State and Extraction.—Thallium cannot be considered as very rare in nature. It exists, indeed, in many kinds of pyrites, which are used at the present time in large quantities, principally for the manufacture of sulphuric acid. I may especially mention Belgian pyrites, from Theux, Namur, and Phillippeville. I have also found it in mineralogical specimens from Nantes, and Bolivia in America.

Strictly speaking, thallium might be prepared from these pyrites; but it is much easier to prepare it by using the deposits from the lead chambers, where it accumulates in relatively large quantities during the manufacture of sulphuric acid. It is from these thalliferous deposits that I have extracted, by a method given in my memoir, the chlorides of thallium which formed the starting point of the study which I have made of the new metal and its compounds.

As to the metal itself, it may be reduced from one of its saline

combinations either by the decomposing action of an electric current, or by precipitation with zinc, or by reduction with charcoal at a high temperature. The chlorine may also be separated from its chlorides by potassium or sodium, under the influence of heat; in this latter case the reaction is very energetic.

The small ingot, weighing fourteen grammes, which I had the honor of exhibiting to the Academy, was entirely isolated by a battery of a few Bunsen elements, first from the chlorides originally obtained, and then from the crystallised sulphate formed directly by the solution of this thallium in pure sulphuric acid.

In concluding my memoir, I wish the Academy to understand that I do not pretend to lay before them a complete research on thallium. My object has chiefly been to show the new metal and some of the principal salts which it forms. In a subsequent communication I will endeavor to fill up some of the gaps at present in its history.—*Chem. News, Lond. July* 19, 1862.

ON COCAINA, THE ACTIVE PRINCIPLE OF COCA.

By M. Lossen.

The author, whose researches follow those of M. Niemann, (see Amer. Jour. Pharm., page 122, 1861, and also Maisch's paper, ibid, 496,) has examined cocaina in reference to the products of its decomposition. When heated with chlorohydric acid it splits into *benzoic acid*, and a new base which the author calls *ecgonin*,* which confirms an observation before made, to wit, that the double chloride of gold and cocaina gives rise when heated to the disengagement of benzoic acid. The new base having for its formula $C_{18}H_{16}NO_6$, cocaina, under these circumstances, is purely and simply split into benzoic acid and and ecgonina by fixing the elements of two equivalents of water. Reduced by concentration, the hydrochloric solution deposits a crystallization of benzoic acid; the mother waters are not precipitated by carbonate of soda, and it was this circumstance that led to the discovery of the new base.

The operation succeeds best when you operate at 212° in a sealed tube; the chlorohydrate of ecgonina crystallizes last. This base is soluble in water; bichloride of plantium precipitates it only in pres-

* From ἔκγονος, son, descendant.

ence of much alcohol; the double salt separates then little by little in long orange yellow prisms.

This mutability of cocain offers an explanation of the fact that attempts to obtain that principle by operating on coca with acid liquids have failed. Perhaps, also, this alkaloid is subjected to an injurious transformation in old leaves. From this action of chlorohydric acid it can in all cases be inferred that it is necessary to avoid the presence of free acids in preparing cocaina from coca leaves.

The following is the process recommended by M. Lossen: The leaves having been digested several times at 140° to 176°, the aqueous infusions are united, precipitated by acetate of lead, filtered, and the lead removed by means of sulphate of soda, and the liquid concentrated in a water bath. Then carbonate of soda is added, and the whole shaken with ether. This is decanted, and the ether renewed five or six times; the alkaloid is dissolved in the ether, which is regained by distillation. The residue on standing yields crude cocaina, which is purified by first triturating it with cold water to remove the coloring matter, and in submitting it afterwards to the treatment already described by M. Niemann. The purer the cocaina is, the more easily it crystallizes in ether, and gives at the same time very handsome rhomboidal prisms.

Amylic alcohol is less favorable to this extraction, but its employment has conducted to the discovery of a new liquid alkaloid, *hygrina*,* volatile, and capable of being distilled with water. Its odor recalls that of trimethylamin. It has a strong alkaline reaction, and gives white fumes with volatile acids.

The muriate of hygrina is crystallizable, but very deliquescent; the chloroplatinate is a yellow flocculent uncrystallizable precipitate which decomposes at ebullition.

With bichloride of mercury this alkaloid produces a milky discoloration occasioned by oily drops.

It appears also to be evolved when coca is heated with caustic lye in milk of lime.

Hygrina is not poisonous.—*Jour. de Pharm.*, Juin, 1862, from *Ann. der Chem. und Pharm.*, t. cxxi., p. 372.

* From ὑγρος, liquid.

ON THE PREPARATION OF PERMANGANIC ACID.

By M. A. Terreil.

The chemist Chevillot first stated that when permanganate of potash is mixed with sulphuric acid and heated to 130° C., violet vapors are obtained, condensible into an oily red liquid, consisting, according to this chemist, of sulphuric acid and permanganic acid.

More recently, M. H. Aschoff has prepared permanganic acid in the same way; but only collecting the small drops forming in the mixture of permanganate of potash with concentrated sulphuric acid.

I now propose to give some new facts about the preparation of permanganic acid, and to describe some new properties of this acid.

Permanganic acid is obtained by dissolving permanganate of potash in pure sulphuric acid, diluted with about half an equivalent of water, taking care that the temperature does not get too high. The solution is a yellowish green. Introduce it into a tubulated retort communicating with a well cooled receiver. In this apparatus neither corks nor other organic matter must be used.

The retort is placed in a water bath and heated to a temperature not exceeding 60° or 70°; at a higher temperature sulphuric acid passes over. The apparatus then becomes filled with violet vapors, resembling those of iodine. The vapors soon condense in the neck of the retort to a thick liquid of a greenish-black color, which contains neither sulphuric acid nor chlorine. This is permanganic acid.

It is difficult to prepare a large quantity of this acid at once. It always, at a certain time, when the proportion of distilled acid commences to be considerable, decomposes spontaneously with a slight detonation. After this decomposition a solid body is found in the apparatus of a brownish-black color and extreme lightness, possessing the properties of sesquioxide of manganese.

If the sulphuric acid solution of permanganate of potash is exposed to moist air for some time, or, better, if a few drops of water are added to it, the permanganic acid will be seen to

float upon the surface of the liquid in the form of oily drops of a greenish-black metallic lustre, which sometimes solidify and fall to the bottom of the liquid. It is difficult to separate this acid from the sulphuric acid which contaminates it; but in this state the permanganic acid may be used for the oxidation experiments described below.

Permanganic acid is a thick liquid, of a greenish-black color and metallic appearance. It seems to be capable of solidifying. It is very greedy of water. Its solution is violet, and it keeps pretty well when dilute and free from dust.

If permanganate of potash is suddenly heated it detonates; but if moderately heated, part volatilises, producing violet vapors, which possess a very disagreeable metallic odor.

This compound is perhaps the most energetic oxidising agent known. It instantly sets fire to paper and alcohol, the latter with explosion. In these combustions there are always produced violet vapors, due to the volatilisation of a certain quantity of permanganic acid. It detonates suddenly, with emission of a beautiful white light when placed in contact with a fatty body. In this case very little acid must be used, for the detonation is very strong.

If a few drops of solution of sulphite of potash is poured upon permanganic acid a very lively reaction is produced with disengagement of light. A large quantity of acid is carried off in the form of violet vapors, which are reduced in the air, and fall down in the form of brown flocks, very light, similar to oxide of zinc when this metal is burned in contact with air.

This curious reaction will doubtless become a beautiful lecture experiment. It succeeds very well with the permanganic acid formed in the sulphuric solution of permanganate of potash.

Permanganic acid is slightly soluble in concentrated sulphuric acid; the solution is green. Its solution in sulphuric acid containing three equivalents of water is violet. This change of color seems to point out that there exist an anhydrous permanganic acid and a hydrated acid.

The instability of permanganic acid has hitherto prevented me from determining its composition.—*Chem. News, London August* 2, 1862, *from Bulletin de la Société Chimique de Paris*

QUICKSILVER MINES OF NEW ALMADEN, CALIFORNIA.

The latest advices from California state that the quicksilver mines of New Almaden, which were so long a subject of litigation, are now again in full operation, and that their yield is immense. According to one account, the workmen have reached the depth of 18 ft. below the surface, and the quicksilver is still found in little globules, so thick that a stream almost follows the stroke of the pick. The *San Francisco Mining and Scientific Press* says—"There have been many recent discoveries of rich cinnabar in various portions of our prolific State, in consequence of the long stoppage of the great New Almaden Mine, owing to tedious and vexatious litigation. This mine, however, is at last in full operation again, and its annual product of over 1,000,000 lbs. of quicksilver will again be in the market. The New Almaden, New Idria, Enriquita, and Gaudaloupe Mines of Santa Clara county, with the many recently discovered and only partially worked cinnabar veins of Napa and Sonamo counties (which contain liquid quicksilver), already turn out some 4,000,000 lbs. of quicksilver per annum—an amount nearly large enough to supply the world—and, doubtless, when these latter shall have been more thoroughly opened, the yield will reach the high figure of 8,000,000 lbs., the value of which, at the rate of 30 cts. per lb., would be no less than $2,400,000; and this we think is a moderate estimate. Hittell sets the average aggregate annual yield of the four great Santa Clara Mines at 3,510,000 lbs., but it has reached as high as 4,275,000 lbs.; and as they are by no means worked to the best advantage, we may safely look for largely increased returns as the operation of the companies are extended. Lack of experience, money, and harassing litigation, heretofore have very much retarded these operations; and we shall not be at all surprised if within the next ten years the annual yield from Santa Clara doubles itself. If the accounts of discoveries in Napa and Sonoma counties approach the truth, then we have a still richer district there, whose yield can hardly be computed. Accounts recently received from Washoe also speak of rich cinnabar veins discovered; we hope the reports are true. With so many mines, and such vast yields, we may safely predict that the wholesale

price of quicksilver will constantly decrease until it reaches 8 or 10 cents per lb. Quicksilver will then be used with a more liberal hand in the search for gold and silver, and many other advantages to the world will arise from its cheapness."—*Journ. Frank. Inst., Aug.* 1862, *from Lond. Mining Journal.*

OAKUM AS A SUBSTITUTE FOR LINT, IN GUN-SHOT AND OTHER SUPPURATING WOUNDS.

By Lewis A. Sayre, M. D., Surgeon to Bellevue Hospital, etc.

I have for many years past been in the habit of using picked oakum, in all cases of suppurating wounds, particularly in connection with opened joints, where the suppuration is excessive. The great number of gun-shot wounds now in Bellevue Hospital, where I use it entirely to the exclusion of lint, has furnished an opportunity for a number of army surgeons to examine its advantages, and they have requested me to make the subject more generally known to the profession through the medium of your valuable medical journal.

One of the objects of lint applied to a suppurating wound, is to absorb the discharge; now as most of the lint is composed either entirely or in great part of cotton, it acts more like a tampon, or a retainer of the secretions, than as an absorber.

If you will take a bale of cotton and immerse it in the river for one month, or even longer, and then remove it, you will find on opening it that the cotton in the centre of the bale is perfectly dry, thus proving that it cannot be soaked through any great thickness, or that it will not absorb moisture. So, when placed over a suppurating wound and left for some hours, it will be found perfectly dry except at the point of contact: acting, in fact, like a bung in a barrel, or a cork in a bottle—to *prevent* the escape of the pus—which necessarily burrows in different directions, thus forming extensive abscesses, and adding greatly to the danger of the patient; and when removed, the pus will gush out in large quantities. Now, if you place picked oakum over these same wounds, you will find after the same number of hours, that the oakum is perfectly saturated with pus, and the wound itself almost perfectly dry and clean—the oakum acting

like a syphon, and discharging the contents of the abscess by capillary attraction.

It is necessary to place under the wound a piece of india-rubber cloth, or oiled muslin, for the sake of cleanliness; and in case of much inflammation, by simply wetting the oakum in cold water, and wrapping the oiled muslin around the limb, or wounded part, so as to exclude the air, you have at once the neatest and most comfortable poultice that can be applied to it. In gun-shot wounds, which go through and through a limb, particularly if made with the "Minnie ball," the whirl or screw of the ball entangles in its thread the muscular fibres and cellular tissue, and separates them from their attachments for a long distance from the real track of the ball itself.

As the muscle and tegumentary tissues are more freely supplied with blood-vessels than the fat and cellular tissue, the consequence is that they begin to granulate much more readily than those other tissues, and will thus often close up the wound, and prevent the free escape of pus, before those parts have perfectly healed, and thus lead to the formation of extensive secondary abscesses. I, therefore, in all cases where no blood-vessels prevent it, pass an eyed probe through the wound and draw through it a few fibres of the oakum or tarred rope, which keeps it perfectly free, and the tar is a very excellent antiseptic, and removes all unpleasant odor.

A few fresh fibres are twisted on the end of the seton at every dressing and drawn into the wound, and the soiled piece cut off and removed with the dressings.

Another great advantage which the oakum possesses over lint, which in these times of heavy taxation is not to be overlooked, is its cheapness. Lint at the present time costs from $1.25 to $1.35 per pound, whereas the finest picked oakum can be obtained at the "Empire Oakum Works," No. 149 West 39th street, for ten cents per pound. And if it were universally adopted in the army it would save many thousands of dollars to the Government, and I confidently believe the life of many a soldier. And no surgeon who has once used it will ever resort to lint again—particularly if the lint is made of cotton.—*American Medical Times, August 9th,* 1862.

RUSSIAN METHOD FOR THE PRESERVATION OF FRUITS, VEGETABLES, &c.

At the last exhibition at St. Petersburg, the following mode of preserving fruits, invented by the *maître d'hotel* of the Grand Duke Nicholas, attracted great attention from amateurs. Quicklime is slackened in water, into which four or five drops of creosote for each quart of water have been mixed; the lime must be neither too much nor too little slacked; there is a certain knack which practice alone can teach. Take a box and lay in its bottom a bed of the slacked lime; above this spread a layer of the materials to be preserved; at the four angles and elsewhere lay packages of powdered charcoal; then make another bed of the lime, followed by another layer of the fruit. When the box is full put on the lid, and close it air-tight. Thus preserved, the fruits will last a whole year.—*Journ. Frank. Inst., May*, 1862, *from Cosmos.*

PROPER TIME OF YEAR FOR CUTTING WOOD.

Four pine trees of the same age, equally sound, which had grown on the same soil and under the same conditions, were chosen. The first was cut at the end of December; the second at the end of January; the third, at the end of February; and the fourth, at the end of March. They were shaped in the same manner, into beams of the same dimensions, and seasoned under the same conditions. Their resistances to bending were then determined by laying them on supports and loading them at the middle. The resistance of the first beam (that felled in December) being called 100; that of the second was 88; of the third 80, and of the fourth 62.

Similar results were obtained as to the durability and strength of posts made of sticks cut at the end of December and of March. The first were still perfectly sound after 16 years; the second at the end of 3 or 4 years broke with the slightest effort. All were buried in the same soil and under the same conditions.

Four oaks as like as possible, and placed in the same condi-

tions, were cut at the end of December, January, February and March. A disk of the same thickness was cut from each at the same height above the ground, and was made the bottom of a vessel filled with water; the sizes of the vessel and height of the water being the same in all. The first (cut in December) allowed no water to pass; the others passed more or less; that cut in January, at the end of 48 hours; that of February, before the end of the second day; that of March, in two hours.

Two similar oaks were selected and felled, the one at the end of December, the other at the end of January, and staves made of the wood. Barrels were made of them, which were soaked in the same way, and then filled at the same time and with the same wine. In a year the barrel made of the wood cut in December had lost 0·14 quart, while the other had lost 7·2 quarts. —*Journ. Frank. Inst., May* 1862, *from Cosmos.*

INDIA-RUBBER VARNISH.

That india-rubber dissolved in various liquids yields a good varnish is well known; but in general they are too viscid for delicate purposes, and are only good for making stuffs waterproof. India-rubber liquefied by heat, dissolved in oil of coal-tar, or drying linseed-oil, does not give a varnish of sufficient fluency, or free from smell. Moreover, a considerable quantity of india-rubber remains undissolved in a gelatinous state, suspended in the liquid, so that the solution is never clear. Dr. Bolley has recently published some remarks on this subject which may be useful. If india-rubber be cut into small pieces and digested in sulphuret of carbon, a jelly will be formed; this must be treated with benzine, and thus a much greater proportion of caoutchouc will be dissolved than would be done by any other method. The liquid must be strained through a woolen cloth, and the sulphuret of carbon be drawn off by evaporation in a water bath; after which the remaining liquid may be diluted at will with benzine, by which means a transparent but still yellowish liquid will be obtained. A more colorless solution may be prepared by digesting india-rubber cut into small pieces for many days in benzine, and frequently shaking the bot-

tle which contains it. The jelly thus formed will partially dissolve, yielding a liquid which is thicker than benzine, and may be obtained very clear by filtration and rest. The residue may be separated by straining, and will furnish an excellent water-proof composition. As for the liquid itself, it incorporates easily with all fixed or volatile oils. It dries very fast, and does not shine, unless mixed with resinous varnishes. It is extremely flexible, may be spread in very thin layers, and remain unaltered under the influence of air and light. It may be employed to varnish geographical maps or prints, because it does not affect the whiteness of the paper, does not reflect light disagreeably as resinous varnishes do, and is not subject to crack or come off in scales. It may be used to fix black chalk or pencil drawings; and unsized paper, when covered with this varnish, may be written on with ink.—*Journ. Frank. Inst.*, 1862, *from Galignani.*

ON A NEW PROCESS FOR THE PREPARATION OF PHOSPHORUS.

By M. Cari-Montraud.

Taking advantage of the long-established fact of the decomposition at a high temperature of dry phosphate of lime mixed with carbon by hydrochloric acid, M. Cari-Montraud founds upon this reaction a new process for the preparation of phosphorus.

Calcined bones finely powdered are mixed with sufficient pulverised wood charcoal to convert all the oxygen of the tribasic phosphate of lime into oxide of carbon. The mixture is put into fire-proof earthen cylinders, glazed inside, which are three parts filled. These cylinders being made red-hot, a current of hydrochloric gas is passed in at one of the extremities.

Under these circumstances the phosphate of lime decomposes immediately. Chloride of calcium, oxide of carbon, hydrogen, and free phosphorus are formed.

The phosphorus is distilled, and is conducted, together with the oxide of carbon, the hydrogen, and the excess of hydrochloric gas, by means of a copper adapter, into a vessel filled with cold water, where the phosphorous vapors are condensed.

The water of this refrigerating condenser becoming very acid by the absorption of the excess of hydrochloric gas, is utilised by putting into it the calcined bones, where they are dissolved or softened, rendering pulverisation unnecessary.

The magma resulting from this maceration is mixed with carbon, and the whole evaporated to dryness before put into the cylinders.

Hydrochloric gas is produced by the decomposition of sea-salt by sulphuric acid. The chloride of calcium forming the residuum in the cylinders can also be utilised by treating it with sulphuric acid, which regenerates the hydrochloric gas, whilst the lime is converted into sulphate of lime, which is useful for manure. Chloride of calcium can also be decomposed by aqueous vapor.—*Chem. News, London, July* 26, 1862, *from Moniteur Scientifique.*

ON THE DECOMPOSITION OF OXALIC ACID BY LIGHT.

By M. W. Seekamp.

A solution containing 5 per cent. of oxalic acid and 1 per cent. of uranic nitrate does not decompose in the dark even at 100° C.; but on being exposed to the light, it disengages a gas containing from 56 to 57 per cent. of carbon. At the same time a slightly soluble green powder of uranous oxalate is precipitated. This precipitate is composed of microscopical, prismatic, square-based crystals, apparently identical with the product obtained by M. Peligot in precipitating chloride of uranium by oxalic acid. A little formic acid is at the same time produced by the combination of nascent oxide of carbon with water.

$$\left.\begin{matrix}C_2O_2\\H_2\end{matrix}\right\}_{\text{Oxalic acid.}} O_2 = CO_2 + CO + H_2O.$$

$$\left.\begin{matrix}C_2O_2\\(Ur_2O)_2\end{matrix}\right\}_{\text{Uranic oxalate.}} O_2 + 2C_2H_2O_4 = 2\left\{\begin{matrix}C_2O_2\\Ur_2\end{matrix}\right\}_{\text{Uranous oxalate.}} O_2 + 2CO_2 + 2H_2O$$

Succinic acid is also decomposed under the influence of light; but this subject will be treated separately.—*Chem. News, London, July* 26, 1862.

ON THE EXAMINATION OF COMMERCIAL SULPHATE OF QUININE FOR OTHER ALKALOIDS FOUND IN THE CINCHONA BARKS.

By Dr. G. Kerner.

In most of the Pharmacopœias and Chemical Manuals we find the well-known ether-test recommended for the recognition of cinchonine and quinidine, in commercial sulphate of quinine. This test consists in treating six grains of the sulphate in question with from sixty to seventy drops (=2 c. c.) of ether in a well-stoppered test cylinder, to which six drops of liquor ammoniæ are added, and in well shaking the mixture. The fluid separates into two layers, a clear aqueous and an ethereal one. The upper layer should not deposit an amorphous or crystalline mass, either immediately or in the course of a few hours. This method suffices in most cases, for it indicates even minute traces of an admixture of cinchonine and of the ordinary quinidine. It indicates clearly one-half to three-quarters per cent.; or if an ether which has been previously saturated with quinidine be employed, even smaller quantities of the latter alkaloid. I have, however, frequently found in my experiments, that ether cannot implicitly be relied on, or recommended as a safe means of separating the bases of the cinchona barks. The ether-test itself exhibits irregularities which render the observation of the reaction a matter of uncertainty. The ethereal solution frequently solidifies to a gelatinous mass, which at times is perfectly clear and transparent, sometimes traversed by net-like layers of enclosed air, which impart to it a crystalline appearance, and give rise to errors, since they render it exceedingly difficult to distinguish whether crystals of quinidine have separated from the ethereal solution or not. It is probable that the cause of the formation of this magma will be explained best by viewing it as a double salt of the quinine salt with the ammonium salt formed in the reaction, since I was able to trace in the gelatinous mass almost invariably sulphuric acid and a salt of ammonium, not met with in the ethereal solution when the reaction went on properly. It was not, however, this, for the most part accidental occurrence, which vitiated the ether-test, but the circumstance which my experiments brought to light,

—that there are alkaloids in the cinchona barks, which, although isomeric, and partly also isomorphous with the ordinary quinidine, still exhibit many abnormal chemical properties, amongst which I may especially mention a very different (far greater) degree of solubility in ether. I made experiments with the sulphates of these quinidine bases which were more soluble in ether, and found that from ten to twenty per cent. of these salts could be mixed with the pure sulphate of quinine without being detected by the ether-test; and it is to be feared that manufacturers may make use of this property of the new alkaloids to enable them to sell under the protection of the ether-test an inferior sulphate of quinine mixed with other cheaper sulphates. Now it would be quite possible to detect an extensive adulteration, when once known, by other means (ex. gr. by treating the alkaloids precipitated from the mixed sulphates with spirits of wine of 20° Beaumé;) but it would be exceedingly difficult, nay, even impossible, qualitatively to detect, by means of this test, smaller unintentional adulterations (impurities.) I therefore set to work to find out a quinine test which would be both accurate and easy of execution, and by which it would be possible to detect even very small quantities of the above *new* bases.

Before I enter upon the description of the experiments made for this purpose, I may be permitted to give a short sketch of the characteristic properties of the cinchona alkaloids in general, on account of the confusion in their nomenclature which prevails among chemists. A few remarks on this subject may, therefore, be acceptable in this place. Chemists who have had an opportunity of studying the cinchona bases must have observed that quinine, cinchonine, quinidine, and cinchonidine are not the only bases found in the barks, but that frequently modifications of these principal bases are met with in the cinchona barks, which differ in many essential points from them. I believe, however, that all organic bases derived from the barks (whether known or not yet known,) may be conveniently arranged into two distinct groups until science succeeds in unravelling the true constitution of these substances, viz:—

I. Group.—Quinine and its isomerides, of the formula $C_{40}H_{24}N_2O_4+x$ HO.

II. Group.—Cinchonine and its isomerides, of the formula $C_{40}H_{24}N_2O_2$.

This classification does not comprise some of the more obscure bases, whose formulæ require further confirmation before they can be accepted as forming part of Groups I. and II. of alkaloids, or whose derivation from cinchonas is doubtful (ex. gr. aricine, paracine, cinchovatine, pitayine, blanchinine, Gruner's bases, etc.)

I. Group.—*The solutions of salts of these bases give, in every instance, the well-known reaction with chlorine water and ammonia. The pure alkaloids form hydrates, which effloresce readily.*

1. *Quinine* (forming crystallizable salts.)—When pure it is generally amorphous, forms however two hydrates, with two and six equivalents of water. Besides many distinctive properties which its compounds with organic and inorganic acids possess, it is distinguished at once by a property which singles it out from among all the cinchona bases, viz., *the property of forming a crystallizable product of substitution with iodine*,—the highly interesting Herepathite. By the aid of the microscope Herepath's reaction enables us also to ascertain whether a commercial quinine salt contains, besides quinine, traces of other alkaloids, or crystallizable extractive matter (*salicine, phlorhidzine.*) This reaction requires, however, great practice.

2. *Quinoidine.*—An amorphous modification of the quinine, to which it stands probably in a similar relation to that of grape to cane sugar. If Pasteur's observation of a product of decomposition produced by the action of sulphuric acid upon quinine is at all correct, quinoidine invariably contains quinicine.

3. *Ordinary Quinidine* (α Quinidine.)—The sulphate of quinidine most frequently (at least formerly) met with is the sulphate of α quinidine. It is of a very different solubility in cold water—from 1 part in 300 to 1 part in 180, *rarely more.* The pure alkaloid crystallizes from spirit in *large, short*, slowly efflorvescing, truncated prisms. Tepid ether dissolves mere traces of the base, which crystallize out on standing for a short time. Its presence in sulphate of quinine is, therefore, readily indicated by the ether-test. Many of its salts exhibit, when compared with the corresponding quinine salts, striking differ-

ences in form and solubility, and in the proportions in which they dissolve.

4. *β Quinidine.*—Crystallizes from spirit of wine in fine needles, which effloresce very rapidly, and is far more soluble in ether than the previous alkaloid. Its sulphate forms small brittle needles, and is more soluble in water than the sulphate of α quinidine (1 part in 110 to 1 in 98.) It possesses the characteristic property of producing an amorphous precipitate with a concentrated solution of iodide of potassium (1 part in 4) in an aqueous solution saturated in the cold, whilst the same reagent produces oily or resinous deposits in aqueous solutions, saturated in the cold of all other cinchona bases, except that of sulphate of quinine. The other salts of β quinidine are more allied to the salts of quinine than those of α quinidine.

5. *γ Quinidine* is even more soluble in ether than the β quinidine; the solubility of its sulphate is on a par with that of the sulphate of α quinidine. From its appearance and specific gravity it cannot be distinguished from the pure sulphate of quinine, and iodide of potassium acts upon an aqueous solution saturated in the cold, in the same manner as it acts upon all other sulphates of the cinchona alkaloids, with the exception of sulphate of β quinidine.

The alkaloids of 3, 4, and 5 of Group I. are only sparingly soluble in alcohol of 20° B.

II. Group.—*Solutions of salts of this group of bases exhibit no change of color on the addition of chlorine water and ammonia. The pure alkaloids form no hydrates, but beautiful anhydrous crystals,* insoluble in ether, (or at all events far less soluble than the α quinidine,) and equally insoluble in alcohol of 20° B.

1. *Cinchonine* is easily distinguished from all the other cinchona bases by the crystalline form and properties of almost all its salts. Its bisulphate is the only cinchona substance which possesses distinct dichroism.

2. *Cinchonidine* (the ordinary) crystallizes from alcohol in hard prisms of a strikingly vitreous lustre. Its salts are generally less crystallizable than those of the bases of the first group and of cinchonine; with hydrochloric acid, however, it forms a very characteristic compound, crystallizing invariably in almost

regular well-formed dense rhomboidal octahedra, (like nitrate of quinine,) whilst all other hydrochlorates of the cinchona bases crystallize in long prismatic needles, often combined in fibrous masses, having the appearance of asbestos. By saturating cinchonidine with sulphuric acid, and comparatively little water, the solution solidifies on cooling, and after some standing leaves a curdy gelatinous magma. Commercial sulphate of cinchonidine is thus frequently found in coherent masses, resembling commercial carbonate of magnesia. The solubility of this compound in water of 15° C. lies between $\frac{1}{100}$ and $\frac{1}{95}$

3. It appears that there are modifications of cinchonidine, similar to those of the bases of Group I., which might be characterized as separate isomerides of cinchonine. A short time ago I obtained an alkaloid, crystallizing in brilliant little scales or small shining needles, from an amorphous sulphate of cinchonidine, which came from France and was sold under the name of *Sulphate de Quinidine*. It dissolved in 108 parts of water of 15° C., and gave with hydrochloric acid long hard rhombic prisms and no rhomboidal octahedra.

In my endeavor to find out a qualitative quinine test, I thought first of employing the peculiar iodide of potassium reaction, described under β quinidine, with cold saturated solutions of the sulphates of the alkaloids, and succeeded in distinctly tracing, by means of this reagent, an adulteration amounting to as little as 0·3 per cent. of the sulphate of quinine with quinidine (especially with β quinidine;) at the same time I perceived that a qualitative test, based upon the iodide reaction, could not be recommended as a mode of commercial analysis, because the precautions which have to be observed are manifold and difficult, and likely to give rise to erroneous observations. For, the hydriodate and the sulphate of quinine are almost equally soluble in cold water, and it is therefore possible that an aqueous solution of the sulphate saturated in the cold, of a perfectly pure quinine, is rendered slightly turbid on the addition of iodide of potassium, if the latter be a little too concentrated, or if one or the other of the solutions shows a different, *i. e.* a lower temperature than 15° C. Moreover, the iodide of potassium of commerce is rarely absolutely free from carbonate of potassa or caustic potassa, which renders the test troublesome for those

who have first to prepare the perfectly neutral reagent. Sulphate of quinine, containing traces of free sulphuric acid, (in the case of its having been recrystallized from strongly acidulated water) is thereby rendered more soluble, and since all solutions of quinine salts, which are more soluble, are precipitated by iodide of potassium, the result of the test would in that case be faulty. In the presence of very slight traces of foreign alkaloids a large excess of the reagent frequently dissolves the precipitate as rapidly again.

Several years ago Howard proposed to employ the slight solubility of the sulphate of quinine in cold water as a criterion of its purity; but the solubility of even the purest sample varies, and is not at all constant, and this mode of testing might, therefore, in some cases, cause the analyst to overlook from 2 to 5 per cent. of quinidine. Accurate determinations of the solubility of organic substances, containing water of crystallization, are not among the easiest of tasks of analytical chemistry, and the possession of a characteristic qualitative test becomes therefore a thing all the more to be desired. A method for the recognition of foreign cinchona bases in sulphate of quinine may, however, be based upon the difference in the solubility of the sulphates of our alkaloids, provided another factor of solubility is taken into account. Dilute solution of caustic ammonia exhibits very different solvent powers with the different cinchona alkaloids. Quinine is dissolved with comparative facility, α quinidine with much more difficulty, β and γ quinidine and cinchonidine only slightly, whilst cinchonine is all but perfectly insoluble in ammonia. The solubility of the cinchona bases, in ammonia, stands therefore in an inversed ratio to that of their sulphates in water. Upon this fact is based the following quinine test:—

A. *Solubility of the cinchona bases* in dilute ammonia.

The dried alkaloids, whether amorphous or crystalline, dissolve very difficultly and slowly, and rarely equally in ammonia; they do not even dissolve in constant proportions when freshly precipitated, and when in a pasty state. I found, however, that they are rendered considerably more soluble by employing ammonia for the precipitation of the alkaloids from their saline solutions, and by adding ammonia in excess till the bases

are redissolved. I have made the following experiments for ascertaining the degree of solubility of the cinchona alkaloids, and I employed two kinds of commercial liquor ammoniæ of different strengths. A, Liq. ammoniæ of sp. gr. 0·92. B, Liq. ammoniæ of sp. gr. 0·96.

1. *Quinine.*—An aqueous solution of pure sulphate of quinine, saturated at 12° to 15° C. contains, as has been pointed out before, not always constant quantities of sulphate of quinine. A great many determinations of solubility, made with pure sulphates, procured from various manufacturers, furnished the proportions 1 : 770 to 1 : 738. Most of the sulphates were soluble in 750 to 755 parts of water of 15° C., and these numbers may therefore be taken as average numbers of solubility. According to Baup sulphate of quinine is soluble in 710 parts of water of 13° C.; according to Jobst and Hesse in 793 to 788 parts at from 6 to 9·5° C.

The salt which served for the following determinations of solubility was dissolved in 752 parts of water of 14·5° C.

5 c. c. of this solution was treated in a test-tube with measured quantities of Liq. ammoniæ, till the cloudiness which at first made its appearance had again completely disappeared, when they required

Of Liq. Am., A.	Of Liq. Am., B.
4·5 c. c.	6·6 c. c.
4·6 "	6·5 "
4·8 "	6·8 "
4·7 "	6·6 "
4·6 "	6·8 "
4·8 "	6·7 "

Samples of pure sulphate of quinine, which were a little more soluble, required a few tenths more of both test-liquids, but I never met with a pure salt which required more than 5 c. c. of the test solution A, and 7 c.c. of the test solution B, per 5 c. c. of the sulphate solution.

It will be a safe course, therefore, to adopt in every case the last mentioned limits of solubility as a basis in the estimation of common quinine salts.

2. " *Quinidine.*—The solubility in water at 15° C. of the

sulphate of α quinidine, employed for the following experiments, was 1 part in 223. 1 c.c. of a solution of the sulphate saturated in the cold, when treated with the above test solutions of Liq. ammoniæ, till the precipitate which appeared at first had completely redissolved, required

Of Liq. Am., A.	Of Liq. Am., B.
10·7 c. c.	12·6 c. c.
10·8 "	12·8 "
11·0 "	12·7 "
11·0 "	12·8 "
10·9 "	12·8 "

1 c. c. therefore requires from 10·5 to 11 times more of the test-liquor A than a corresponding quantity of a solution of sulphate of quinine saturated in the cold.

3. β *Quinidine.*—Solubility of the sulphate in water of 15° C.

(a) of a sample prepared in the year 1859, 1 : 112.

(b.) of a sample prepared in the year 1860, 1 : 105·5.

1 c. c. of a solution of these samples, saturated in the cold, required, in order to produce the above reaction—

	Of Liq. Am., A.	Of Liq. Am., B.
For sample A, on an average	14·3 c. c.	on an average 15·2 c. c.
" " B, " "	14.6 "	" " 15·6 "

or about 12 times more than a solution of the pure quinine salt. After standing for half an hour the ammoniacal solution became turbid, and the alkaloids separated, probably completely, in the form of small granular crystals, which were not redissolved even in a large excess of NH_4O.

4. γ *Quinidine.*—Solubility of the sulphate in water of 15° C. $=\frac{1}{205}$.

1 c. c. of a solution, saturated in the cold, required on an average of Liq. am. A, 10·9 ; of Liq. am. B. 12·5.

5. *Cinchonidine.*—The sulphate of cinchonidine of commerce contains frequently considerable quantities of quinidine, sometimes also traces of quinine. Its insolubility in water of 15° C. varies from $\frac{1}{98}$ to $\frac{1}{110}$.

1 c. c. of a solution of the sulphate of cinchonidine, saturated in the cold, required on an average of Liq. am. A, 16 c. c. ; of

Liq. am. B, 15·9—16·2 c. c., or from 12 to 13 times more than 1 c. c. of a solution of sulphate of quinine.

6. *Cinchonine.*—Water of 15° C. dissolves $\frac{1}{54}$ of its own weight of sulphate; 0·5 c. c. of this solution remains turbid even after the addition of as much as 150 c. c. of either of the ammoniacal test-solutions. The alkaloid separates in large flakes, which become finely divided when the liquid is shaken, imparting to the solution a slight opalescence, and which are slowly deposited at the bottom of the test-tube when allowed to stand quietly for a short time, since the alkaloid had never been dissolved, but merely suspended as a finely divided precipitate in the liquid.

By adding, however, from 1 to 6 drops of solution of cinchonine to about 30 to 55 c. c. of a solution of sulphate of quinine, and treating 5 c. c. of this mixture with 5 c. c. of test-liquor A, or 7 c. c. of the ammonia solution B, the cinchonine is at first dissolved, because it is precipitated, together with quinine, in a finely divided state, and because ammonia then acts more readily upon it. After the lapse of an hour, however, flakes of precipitated cinchonine again make their appearance, even in this mixed solution.

B.—Principle and Application of the Quinine Test.

According to A., ex. 1, we may take it as an established fact, that 5 c. c. of an aqueous solution of pure sulphate of quinine, saturated in the cold at 15 c., do not require more than 5 c. c. of the ammonia solution A, and 7 c. c. of the ammonia solution B, in order to become precipitated and redissolved.

This quantity of ammonia is however insufficient, as was proved by experiments 2, 3, 4, 5 and 6, whenever the sulphate of quinine contained larger or smaller quantities of the sulphate of α, β, and γ, quinidine, cinchonidine and cinchonine. The last named salts are dissolved, first, by digesting with water any quinine salt which is suspected of having been adulterated by these admixtures. They can be traced with great accuracy by adding just 5 c. c. of the test fluid A, or 7 c. c. of fluid B, to 5 c. c. of an aqueous solution saturated in the cold, of a sample of the mixed sulphates which has to be tested for these less

valuable salts. Even very slight traces of the foreign alkaloids which escape detection by the ether method, may be recognized in the solution by the opalescence of the mixture, provided the experiment is properly carried out.

2. *Test Fluid.*—If Liq. ammoniæ of the strength ordered in the London Pharmacopœia, that is, of sp. gr. 0·960, is at hand, it may serve as a test-fluid; it is more accurate and safe, however, to standardize an ammonia solution of unknown strength by means of a standard solution of sulphate of quinine saturated in the cold, and of known purity.

3. *Preparation of the Solution of Sulphate of Quinine required for Analysis.*—It is especially necessary that the distilled water employed should not be warmer than 15° C., since the sulphate of quinine is considerably more soluble in water which is only a few degrees above that temperature. Water possessing this temperature is easily obtained both in summer and winter; if above that temperature, it must be cooled down by placing the vessel containing the quinine salt into fresh spring water. From two to four grammes of the sulphate (which must, of course, be neutral) are agitated in a small beaker with 20 to 40 c. c. of distilled water till they are dissolved to a pasty fluid. After digesting for about half an hour, the whole is thrown on a small filter, either of paper or linen, and squeezed, and the solution thus obtained again filtered till it is obtained perfectly clear.

4. *Qualitative method.*—5 c. c. of this solution of sulphate of quinine are measured out into a dry test-tube, then treated with 5 c. c. of the standard solution of ammonia of sp. gr. 0·92, or with 7 c. c. of a standard solution of ammonia of 0·96 sp. gr., or also with a corresponding number of c. c. of a standard solution of ammonia of different sp. gr., so as to prevent the two layers of liquid from mixing at first as little as possible. The test-tube is then closed with the thumb, and the liquid made to run repeatedly backward and forward, whereby the mixture will be found to have become perfectly clear and free from suspended alkaloid, or will become so after a few minutes. Violent agitation of the liquid in the test-tube is objectionable, because ammonia gas is liberated, and would render the reaction inaccurate. Should the experiment give a doubtful result,—that is,

should the liquid exhibit only a slight cloudiness,—a more concentrated solution of the foreign alkaloids with which the quinine is contaminated is made by digesting a larger quantity of the sulphate of quinine under examination in less water, ex. gr. 5 grm. in 30 c. c. of water. For commercial purposes it will, however, scarcely be required to submit a sulphate of quinine which had been dissolved in the former amount of water and showed no opalescence, or only a slight cloudiness, with the above standard solution of ammonia, to further tests; since a slight cloudiness which disappears on the addition of a few more tenths of a c. c. of the ammonia solution, would scarcely justify one in forming an unfavorable opinion of a sample of commercial sulphate of quinine.

5. *The following numbers were obtained in the Qualitative Analysis by means of a Standard Ammonia Solution:*

Mixture.	Results.
5·0 grm. of sulphate of quinine, and 0·25 " " β quinidine. (=5 per cent. impurities.)	An immediate heavy precipitate.
5·0 grm. of sulphate of quinine and 0·05 " " β quinidine. (1 per cent. impurities)	Strong cloudiness; after a few minutes a heavy flocculent precipitate.
5·0 grm. of sulphate of quinine, and 0·025 " " β quinidine. (½ per cent. impurities.)	Strong opalescence; after half an hour's standing a precipitate of β quinidine.
5·0 grm. of sulphate of quinine, and 0·01 " " β quinidine. (1-5th per cent. impurities.)	A slight cloudiness, which increased in the course of two to three hours, and exhibited a slight but distinct precipitate after four hour's standing.
5·0 grm. of sulphate of quinine, and 0·005 " " β quinidine. (1-10th per cent. impurities.)	No reaction; a more concentrated solution (*vide* sub. B. 4) showed however a slight opalescence.

Five experiments made with admixtures of corresponding amounts of pure sulphate of cinchonidine to a pure sulphate of quinine gave the same results;

Mixture.	Results.
5·0 grm. of sulphate of quinine, and 0·005 " " β cinchonidine. (1-10th per cent. impurities.)	Even a more distinct reaction than in the case of β quinidine.

Five experiments of admixtures of 5, 1, ½, $\frac{1}{5}$ and $\frac{1}{10}$ per cent of sulphate of cinchonine to pure sulphate of quinine, gave almost equally close results; the separation of the alkaloid

took place, however, for the most part, in flakes, without any previous opalescence.

6. *Quantitative Method.*—There can be no doubt that the ammonia test may also be employed with advantage for the quantitative estimation of foreign cinchona salts contained in sulphate of quinine, for the separation of which hitherto tedious and uncertain methods had to be employed. It will be found the more useful when an actual adulteration has to be traced, or when a so-called *Chinin-sulphuric naturale*,—sulphate of quinine which contains much quinidine,—such as has been frequently met with in commerce lately, has to be examined.

Such samples will have to be extracted with water by a somewhat modified process, viz., by treating about 5·0 grm. repeatedly with small quantities of water, till a portion of the filtrate gives no longer the ammonia reaction. The extraction with water must not be interrupted too soon, and the qualitative test —for which the least possible quantity of the filtrate only ($\frac{1}{2}$ to 1 c. c.) is employed—ought only to be resorted to when, according to a preliminary rough experiment, it may be expected to give a negative result. The whole of the filtrate is then introduced into a graduated measure glass, and diluted to a round number of c. c. (varying probably from 30 to 100 c. c.,) and a measured quantity of the liquid ($\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, etc.) mixed with the standard ammonia solution in the proportion employed for the qualitative analysis. The precipitated alkaloid is allowed to settle, and then rapidly thrown on a good filter, washed at first with a weak solution of ammonia, and lastly with water, and well dried at 100° C. till its weight remains constant. The results are sufficiently accurate.

7. The following quantitative numbers were obtained: (*a.*) a mixture of 4·0 grm. of pure sulphate of quinine, and 1·0 grm. of pure sulphate of cinchonine, were separated according to B. 6. Total aqueous extract =100 c. c.

50 c. c. treated with 52 c. c. of ammonia solution of 0·92 sp. gr. left 0·405 grm. of alkaloid undissolved. 5 grm. of the purposely adulterated quinine salt contained therefore $\frac{100 \times 0{\cdot}405}{50} =$ 0·810 of a foreign alkaloid (Ci.) or $0{\cdot}810 \times 1{\cdot}217 = 0{\cdot}986$ of sulphate of cinchonine.

After having ascertained that the foreign admixture consisted of cinchonine or cinchonidine, the weight of the alkaloid

found is simply multiplied by 1·217 in order to find the amount of sulphate present, or in the case of quinidine, etc., by the factor 1.333.

A mixture of 4·80 grm. of pure sulphate of quinine, and 0·20 grm. of pure sulphate of quinidine, were separated in a similar manner. Total amount of filtrate = 50 c. c. 25 c. c. were precipitated with 35 c. c. of the standard ammonia solution of 0·96 sp. gr., and gave 0·072 grm. of a precipitate $\frac{50 \times 1{\cdot}3330 \times {\cdot}72}{25} = 0{\cdot}1919$ instead of 0·20.

If the composition of the foreign sulphate is not known—which is generally the case—it will be safer simply to compare the quantity of the free base found with the average percentage of pure sulphate of quinine = 75 per cent. (Freshly re-crystallized sulphate of quinine, dried by pressure between filter paper without application of heat, contains 73·5 per cent. of quinine.)

8. *Examination of other Officinal Cinchona Salts.*—It is evident that the ammonia test can be employed likewise in the estimation of cinchona compounds, which are more soluble than sulphate of quinine, of course by employing other proportions for their mixtures. 1 c. c. of pure hydrochlorate of quinine requires ex. gr. 22 c. c. of the ammonia solution of sp. gr. 0·92 for its precipitation, and in order to re-dissolve the alkaloid in excess, whilst solutions of other hydrochlorates of the cinchona bases cannot be re-dissolved, even on adding a large excess of ammonia. In examining these readily soluble salts it becomes necessary, however, first to dilute measured quantities of solutions, saturated in the cold, with water to the proportion in which sulphate of quinine is soluble, before adding the ammonia solution, since ammonia precipitates quinine from concentrated saline solutions, in lumps which are as difficult to re-dissolve when they have once been precipitated, as are the foreign bases.—*London Pharm. Journ., July*, 1862, *from Zeitschrift für Analytische Chemie.*

A PROCESS FOR ESTIMATING TANNIC ACID IN GALLS.

By Mr. J. H. Marriage.

Observing that your number for the present month contains a process for estimating Tannic Acid, I venture to send you de-

tails of another method, which will, I think, be found equally simple, more accurate and much more convenient than can be the case with one depending on hydrometrical measurement. It must be remarked, however, that the method now described is not applicable to *all* substances containing tannic acid, as its indications with regard to catechu and myrobalans are not to be relied on, owing, probably, to the presence of some other acid possessing the power of precipitating salts of copper. Gallic acid has not this power, and its presence is therefore no obstacle to a satisfactory experiment. With galls this process gives accurate results, as I have seen proved by careful comparison with the centigrade gelatine process.

The solution I employ is one of ammonio-sulphate of copper, containing in each decem 634 grains of crystallized sulphate of copper, and just sufficient liquid ammonia to re-dissolve the precipitate first occasioned. Two septems of this solution indicate one grain of tannic acid. It occasions an olive-green precipitate, and at the same time deepens the color of the liquid operated on. As the experiment approaches completion, the color again becomes fainter, and with perfectly pure tannic acid would probably vanish altogether.

It is at first almost impossible to filter the liquid, but when the proper quantity of the copper solution has been added, the precipitate is readily separated. No great excess of copper can be put in unobserved, owing to the intense color of the test solution. I find it most convenient to exhaust the powdered galls with water in the proportion of a decem to 100 grains, and, in that case, if half the liquor be operated on at once, the number of septems of test solution employed directly indicates the percentage of tannic acid.

This method, while equally accurate, has several advantages over the gelatine process. Owing to the color of the precipitate, it is more readily employed by artificial light. A smaller quantity of test solution is required, for it is impossible at ordinary temperatures to employ a gelatine solution much stronger than so as to require *ten* septems to precipitate one grain of tannic acid, consequently the alkalimeter may require re-filling several times, occasioning loss of time and liability to error. Lastly, the copper solution may be kept for a long time

unchanged, while a solution of gelatine cannot always be depended upon even the day after it is made.

I observe that Fownes estimates the tannic acid in galls at from 30 to 40 per cent., whilst Royle puts 60 per cent. as the maximum. My own experiments lead me to be dissatisfied with blue galls containing less than about 65 per cent. A sample of Chinese galls contained 52 per cent.—*Pharm. Journal*, April, 1862.

ON THE PREPARATION OF PURE CAUSTIC SODA ON THE LARGE SCALE.

By Dr. Ph. Pauli, of the Union Alkali Works, St. Helens, Lancashire.

Three tons of commercial caustic soda, containing excess of water, alumina, and all the impurities which commonly occur in this substance, are fused in a cast-iron pot. During the evaporation nearly all the carbonate, and by far the larger quantity of the other salts, separate out on the surface as a scum, and can be easily removed. The liquid mass is then heated to dull redness, and kept at that temperature during the night. In the morning the mass appears perfectly transparent, the sides and bottom of the vessel being coated with cauliflower-shaped masses of crystals consisting of silicate of alumina, with chloride and sulphate of sodium and a little lime. The clear fused liquid is ladled off from these crystals, and when cooled is ready for use.

The soda thus obtained is perfectly free from alumina; a small quantity of the soda was fused in a platinum crucible, and some pure alumina added. This remained undissolved in the fused mass, swimming about like a precipitate in the red-hot liquid. On cooling, water was added to this fused mass, and the alumina was found to dissolve completely. If the commercial soda contains oxide of iron, this also separates out completely during the process of fusion. Lime, on the other hand, is dissolved in large quantities by the caustic soda, but it is completely separated by solution in water. The caustic soda prepared in this way is hard and brittle, and can be easily obtained as a fine powder by attrition in an iron mortar. It contains only a trace of carbonate of soda. This product, which will

doubtless prove a valuable reagent in chemical laboratories, is now prepared on a large scale by Messrs. Evans and M'Bryde, Union Alkali Works, St. Helens, Lancashire.—*Chem. News, London, June 28th*, 1862.

ON THE APPARENT DIFFICULTY OF DETECTING STRYCHNIA IN THE PRESENCE OF MORPHIA—DISCOVERY OF A MORE POWERFUL REAGENT FOR STRYCHNIA.

By JOHN HORSLEY, F. C. S., Analyst for the County of Gloucester.

The first part of the title of this paper has reference to that of Dr. Reese, contained in the "Chemical News" for June 7. It is very true, as stated by Dr. Reese, that morphia in excess has the power of preventing the effect of chemicals upon strychnia, as ordinarily practised; but the difficulty of detecting it is more apparent than real, all that is necessary being (if the two alkaloids have really been extracted from a dead body) to adopt the method of precipitation of strychnia by the addition to the concentrated aqueous or neutral solution of a few grains of neutral chromate of potash, as suggested by me at the British Association for 1856, aiding the formation of the golden-colored crystalline precipitate by brisk agitation for a minute or so with a glass rod, then carefully decanting the supernatant liquor containing the morphia (the chromate of which is longer forming;) or it may be passed through a very small filter, and the chromic salt of strychnia collected for experiment with strong sulphuric acid, the merest particle of the salt being sufficient. Under the microscope, the crystals of chromate of strychnia are in the form of little golden-colored stars; but the corresponding salt of morphia is that of little round granules, with a dark ring on the outside. As a matter of course, these latter, when touched with sulphuric acid, turn green, and so, when in excess, have the effect of masking the reaction of strychnia, which remains passive.

As regards the new reagent,—that is, the nitro-prusside of sodium,—which I used quite by chance the other day, and was astonished at the result, a comparison between it and the bichromate of potash is immensely in favor (where no other alkaloid but strychnia is present) of the nitroprusside, the extreme

limit of detection being $\frac{1}{100000}$th; indeed, 75,000 is quite marked, but the bichromate scarcely reaches 3000. There is also a greater degree intensity as well as persistency of color, nor is there any disposition to that greenness as observed in the reduction of chromic acid; and, as far as I can see, it is entirely free from objection, and commends itself as *the* test *par excellence*. It is useful as a precipitant of strychnia, the crystals being in the form of very long spiculæ, and sometimes needles, which strike a splendid color with sulphuric acid.

I arrived at the test figures thus:—1 grain of strychnia was first dissolved in 100 of water. Of this solution, 1 drop was added to 999 of water; a fragment of nitro-prusside was then thrown in, and agitated till dissolved. Of this mixture, 1 drop was let fall into a small white-ware dish, and dried at a steam heat, and on cooling the color was developed by drawing across the spot a glass rod dipped in sulphuric acid.—*Chem. News, London, June*, 21, 1862.

ON THE NITRO-PRUSSIDE OF SODIUM AS A TEST FOR CERTAIN ALKALOIDS.

By John Horsley.

Since announcing the above test I find by using it in the manner stated, that the plea for the non-detection of strychnia in the presence of morphia no longer holds good, as subsequent experiments with five and even ten times the amount of morphia prove.

I find also that one drop of a solution of strychnia of one per cent. strength, agitated with one or two drops of a saturated solution of the nitro-prusside, produces an abundant crop of crystals for an infinitude of experiments with sulphuric acid,—the crystals under the microscope being in long nitre-shaped tufts and needles. A similar experiment with brucia produces larger and broader needles having lancet points, totally different from strychnia, besides being different in its reaction with sulphuric acid.

A similar experiment with morphia also shows certain characteristics; thus, the crystals are for the most part of a peculiar

star-fish shape for the larger compound crystals, which appear to be made up of plates or layers of single squares.

These crystals when collected on a filter and dried, produce the usual orange-red colored reaction with nitric acid, but unlike pure morphia, when touched with sulphuric acid, assume a deep sepia brown with a purplish shade, which is more or less persistent,—totally different from the reaction on any other alkaloid.

Possibly, by applying this test to some other alkaloids, we may obtain some useful characteristic by which they can be recognised better than by some of our present methods. —*Chem. News, London, June* 28, 1862.

THE CINNAMON GARDENS OF CEYLON.

The traveller who visits Colombo will scarcely fail to enter the cinnamon gardens, in order to enjoy the delightful, peculiar odor of the bark of this remarkable bush, which plays such an important part in the history of Ceylon.

During the prosperous period of the cinnamon culture, the five largest cinnamon plantations on the south-western part of the Island had a circumference of fifteen to twenty English miles. To a considerable degree all the other profitable productions of the Island were neglected. The cultivation of cinnamon—a monoply of the different governments which have successively ruled and plundered Ceylon and its inhabitants—was carried on particularly by the Dutch East India Company with barbarous rigor. The smallest theft of cinnamon, or intentional injury of the tree, was punished with death. For breaking off a branch, the penalty was cutting off the arm. Every plant which accidentally grew in the garden of a private citizen was the property of the government, and the cinnamon-gatherer or cinnamon-peeler had the right to collect its bark. To disturb such a plant,—even although but to transplant it,—was a crime to which life was a forfeit. The workmen who were engaged in collecting, peeling and preparing the bark, belonged to the caste of the Chalias,—the lowest class. Even under the English rule this monopoly of cinnamon, so injurious to trade, continued, until it was finally abolished in 1832, and the merchants of Columbo and Galle were able to

participate in the trade of this important article of commerce by paying an export duty of three shillings per pound. This tax, however, appeared much too high, since the selling price of the cinnamon in Europe was but six to seven shillings, and this advance in price stimulated foreign merchants to supply their wants with other kinds of cinnamon—from the Laurus and Cassia—obtained in Cochin China and Java.

When finally the government recovered from its delusion, and reduced the export duty to one shilling, and finally entirely relinquished it, the different substitutes for that cinnamon which appeared originally to belong to the Island of Ceylon* alone, as a natural monopoly, had already on account of their much greater cheapness, found an entrance and sale in Europe, and the culture of the finer sorts became yearly less profitable. The price fell, and the consumption diminished. Only the inferior kinds paid for exportation. And, strange to say, these inferior and cheaper sorts now began to supplant the Cassia in the English market, as during the high prices of the monopoly the cheap Cassia had supplanted the much esteemed true cinnamon. At the present time only 14,000 to 15,000 acres of land are under cultivation, most of which are in private hands; they yield annually from 800,000 to 900,000 pounds of cinnamon, worth from £40,000 to £50,000.

The Chalias are now no longer—as formerly under the Portuguese and Dutch—serfs or slaves attached to the soil, and liable to be sold with it; but free laborers, entitled to receive an adequate reward for their services.

The cinnamon gardens in the neighborhood of Colombo, although for the most part in a decline, still give to the whole district an extraordinarily gay and lovely appearance. The shrubs four to six feet high, with their delicate, beautifully green laurel-like

*Sir Emerson Tennent, however, in his work on Ceylon, disputes its being a native of this island. In no European or Asiatic author is mention made of cinnamon as a production, or as an article of trade of Ceylon, until the end of the thirteenth century. Although in the earliest times it was introduced into Europe from Africa by way of Arabia, yet the merchants trading with the island first had knowledge of the appearance there of this valuable spice about the twelfth or thirteenth century. The learned author considers Africa as its native country.

leaves and light yellow flower stalks, set off by the snowy white sandy alluvial soil in which they best flourish, appear doubly fresh and vigorous. The time of blooming is in January; the fruit ripens in April, when the plant is the richest in sap. In May the peeling of the branches begins, and it lasts till October. The cutting and gathering of the shoots, one year old, and as thick as the thumb, is very troublesome, and requires many hands. Each workman cuts off as many branches as he can carry in one bundle, and then with the point of a curved knife skilfully loosens the bark from the wood, and with great care peels off the gray epidermis and bast tissue, and lays the stripped, parchment-like cinnamon in the sun, when it dries and rolls up. An uncommonly delicious, aromatic perfume hovers around the spot where the peeling of the bark is performed, like that exhaled on the breaking of a twig or a leaf. Whatever travellers, however, may relate of the odor of the groves as wafted to them at sea for a considerable distance, yet it would appear that this agreeable smell arises much more from other aromatic productions in which the island is so rich, than from the cinnamon, which yields it only to its immediate neighborhood. The best kind of cinnamon is as thin as strong paper, delicate, brittle, of a fine golden yellow color, sweet and spicy; the coarser sorts are thicker, of a darker brown color, pungent, biting, and leaving in the mouth a bitter taste. In the storehouses the cinnamon is sorted, the quills placed inside of each other, packed in bundles of four feet in length, and sewed up in packages of ninety pounds weight. In all the crevices and interstices of the package a considerable quantity of pepper is strewed, in order to preserve the cinnamon during the transportation, whereby both spices are improved. The black pepper attracts the excess of moisture, and refines the odor of the cinnamon.

In consequence of the decline of the cinnamon culture, attributable to the change of taste among the people, and thereby to the comparatively trifling consumption of the spice once so highly valued, the cultivation of coffee in Ceylon has increased ten-fold in the last twenty years, and the want of laborers is the only cause, that with the remunerative profit it affords, it has not increased still more.—*Vierteljahresschrift fur praktische Pharmacie.* G. J. S.

ON THE PREPARATION OF IODIDE OF POTASSIUM, AND SOME OTHER IODIDES.

By W. Stevens Squire, PH.D., F.C.S.

I propose to bring under your notice this evening a beautiful process for the preparation of iodide of potassium, which has lately been devised by Baron Liebig, and I shall take this opportunity of making some practical remarks upon this process, and on some other points connected with the iodides employed in medicine.

Of the many processes which have been recommended for the preparation of iodide of potassium, I believe only three have been found at all practical:—1. A solution of iodide of iron or zinc is decomposed by a solution of carbonate of potassium. 2. Iodine is added to a warm solution of hydrate of potassium; the color disappears with a formation of iodide and iodate of potassium, the solution is evaporated to dryness, and heated with charcoal, which reduces the iodate to iodide. 3. Iodine is added to a solution of sulphide of barium; in this case sulphur is precipitated, and iodide of barium is formed. This solution is boiled with powdered sulphate of potassium; iodide of potassium then remains in solution, and may be filtered from the insoluble sulphate of barium. This last process has the great disadvantage that the product is rarely, if ever, free from sulphur compounds, and is rather inclined to blacken when heated; in other respects it is a beautiful preparation, and is very free from sulphates, chlorides, and other impurities generally found in iodide of potassium. In the first two processes purified pearl-ashes are used instead of pure carbonate of potassium, which is too expensive for the purpose. In this way the various impurities of the potashes find their way into the iodide of potassium, or the mother-liquors must be rejected, and the iodine recovered from them, which is not found to be an economical plan.

In order to meet these objections, Baron Liebig has proposed the following mode of preparation: 1 part of phosphorus is placed in a basin, and covered with about 40 parts of hot water, and 20 parts of iodine are gradually added, with frequent stirring; violent action takes place, and a great portion of the

phosphorus is converted into the amorphous variety, which however in no way interferes with the process, as the amorphous phosphorus reduces the iodine just as well, though not quite so fast. The colorless liquid, which consists of a solution of phosphoric and hydriodic acids,

$$P+5I+4H_2O = H_3PO_4+5HI.$$

is then poured off from any excess of phosphorus, and milk of lime is added until the mixture becomes alkaline; the whole is now brought upon a linen filter, and the precipitate, which consists of phosphate of calcium, is pressed and washed; the filtrate contains nothing but iodide of calcium, and is now to be boiled down with twelve parts of sulphate of potassium in powder (this quantity is not quite sufficient to decompose the iodide of calcium). When concentrated to about half, the whole is allowed to cool and remain at rest for six hours, and then filtered, the precipitate being pressed as before. A small quantity of PURE carbonate of potassium is then added to the filtrate, which removes every trace of lime, and the filtered solution now yields, on evaporation, crystals of pure iodide of potassium. A quantity of iodide of potassium, prepared in this way by Pettenkofer, yielded almost the theoretical quantity. By a modification of this process we may prepare the iodides of sodium, lithium, barium, strontium, calcium, magnesium, manganese, ammonium, etc. etc.

In repeating Liebig's experiments I find the iodides prepared in this way very easily acquire a peculiar pinkish hue, and that it is very difficult to get them to crystallize properly; what the cause of this is, I do not know, but the objection is completely removed by fusing the salt before crystallization,—the iodides after this treatment crystallize beautifully, and retain their color remarkably well. A specimen of iodide of ammonium prepared in this way, by fusing the iodide of barium, was found to have no superior as an iodizer for photographic purposes; and this is perhaps the best test of its purity. With this slight modification, I think that the process of Baron Liebig is one of the best ever proposed for the manufacture of iodide of potassium; the potassium salt used is at once the cheapest and the purest, and the only other item of cost in the materials is the

phosphorus, but one ounce of this body is sufficient for the production of one pound and a half of iodide of potassium, so that it only costs about one penny for every pound of iodide manufactured by this process.

Proto-iodide of Mercury.

The Pharmacopœia directs, for the preparation of this compound, that eight parts of mercury should be rubbed with five of iodine, with the addition of a little spirits; the powder thus produced is of a dull olive color, and consists of pure iodide of mercury. There is found in commerce a powder of a beautiful brilliant yellow color, which sails under the name of iodide of mercury, and which is often preferred to the pharmacopœial preparation, on account of the beauty of its color. This brilliant powder is prepared by precipitation from the proto-nitrate of mercury, but as this salt is insoluble unless a certain proportion of nitric acid is present, the free nitric acid so acts upon the iodide at the moment of its precipitation that the product is contaminated with a certain proportion of biniodide.

The presence of this last is conveniently proved by heating a sample of the yellow iodide with a little aniline, which possesses the property of producing the well-known magenta color when treated with a persalt of mercury. The pharmacopœial preparation, if no excess of iodine has been used, does not exhibit this reaction. As the biniodide of mercury is so much more powerful in its action than the protiodide, the substitution of the yellow for the pharmacopœial preparation is highly objectionable and might be attended with danger.

Periodide of Iron.

It would have been hardly worth while to bring this subject under the notice of the Society, if it were not according to the handbooks of chemistry still a moot point, whether the periodide of iron exists or not.

To determine this question, a quantity of iodine was divided into three parts; two of these were combined with iron so as to form a pale-green liquid, the third portion was then added, and the whole boiled so as to promote combination. After the dark-brown solution had cooled, it was shaken up with about three

times its volume of ether. In a little time the whole of the ether was found floating upon the water, and had carried with it the whole of the iodine, leaving the iodide of iron dissolved in the water, from which carbonate of ammonium threw down the white carbonate of iron. This experiment pretty conclusively proves what our President asserted in the "Philosophical Magazine," in July, 1836, viz. that the periodide of iron had no existence, and that the brown solution obtained by exposing a solution of iodide of iron to the air was nothing more than a solution of iodide of iron with some free iodine.—*London Pharm. Journ.*, *May*, 1862.

ON THE PRESENCE OF RUBIDIUM IN CERTAIN VEGETABLE SUBSTANCES (BEET-ROOT, TOBACCO, TEA, COFFEE, GRAPES).

By M. L. Grandeau.

On the 24th of February last, I had the honor to communicate to the Academy the results of my researches on the presence of rubidium in the salts from beet-root, and in the mother-liquors obtained from treating them for the extraction of chloride of potassium. Since then I have actively pursued this research, both in the laboratory of the upper Ecole Normale and also in the important factory of M. Lefebvre, distiller at Corbehem, who has kindly placed at my disposal the substances necessary for extracting chloride of rubidium on a larger scale.

Thanks to this assistance, I now possess 400 grammes of pure chloride of rubidium, about half of which has been prepared at the factory at Corbehem, according to my instructions, by the assistance of M. Martel, a skilful young chemist attached to M. Lefebvre's establishment.

When presenting to the Academy, at a subsequent sitting, the new salts of rubidium which I had been able to prepare from the pure chloride at my disposal, I will describe the processes which I have employed for the extraction of the chloride, and will show by the aid of a few figures that the quantity of rubidium annually removed from one hectare of land by beet-root is an amount not to be neglected from an agricultural point of view.

I now propose to submit to the Academy some new results,

proving the great dissemination of rubidium in nature. Having found the new metal in the salts from beet-root, which it is known are very rich in potash, it seemed of interest to seek for it in other vegetable substances, which, by the readiness with which they remove potash salts from the soil, more or less approach beet-root in this respect. I will confine myself in this extract to point out the analytical results which I have obtained, omitting the methods of separation and analysis given in my memoir.

1. *Tobacco.*—I have at present only examined the leaves from Kentucky and Havanna. M. Schlesing, Directeur de l'Ecole d'Application des Tabacs, has been good enough to evaporate to dryness in his laboratory a certain quantity of water which had been used for the prolonged washing of Kentucky leaves. The ignited residue was tolerably white, spongy, and very rich in potash. On spectral analysis this residue gave the characteristic lines of lime, lithium, potassium, and rubidium. The quantity of lithia was very slight. There was, on the other hand, a notable quantity of rubidium.

Leaves from Havanna, best quality, were carefully burnt; their ashes gave me on analysis results identical with those obtained from the Kentucky leaves.

2. *Coffee and Tea.*—Coffee and tea completely and carefully incinerated left ashes rich in potash. An examination of these ashes, after appropriate treatment, showed in each of these products considerable quantities of rubidium, but not a trace of lithium. Coffee is much richer in rubidium than tobacco.

3. *Grapes (crude tartar).*—M. Kestner, of Thaun, has kindly sent me, at my request, some mother-liquors obtained in the treatment of crude tartars. These liquids were freed from organic matters and foreign substances which they contained, and the residues then submitted to spectral analysis. I am able to state definitely that they contain rubidium, but in very small quantity.

It appears certain from these facts that rubidium is one of the most widely distributed simple bodies in nature. The most different vegetable bodies from the most distant localities remove it from the soil. Moreover, it is evident from my researches that the presence of rubidium is not necessarily allied with that

of lithium, as might have been imagined from the analyses of minerals and waters in which M. Bunsen has discovered this metal. I ought to add that several vegetable bodies of which I examined the ashes appeared to contain no rubidium, although many of them were rich in potash. I may especially mention as instances the colza, the cacao, the sugar-cane, and some species of fucus.

The dissemination of the new alkaline metal being placed beyond doubt by the researches of which this is a *résumé*, it is of great interest to examine with this particular object the soils in which the above-mentioned vegetables grow. With this view I have undertaken experiments and analyses, which I am pursuing as rapidly as the long and delicate character of these investigations will allow.—*Chem. News, London, June* 7, 1862, *from Comptes Rendus.*

ON THE CAPACITY OF ARSENIOUS ACID FOR BASES, AND ON SOME ARSENITES.

By Professor Bloxam.

Arsenious acid was usually considered bibasic, but the experiments he had made tended to show that it could neutralise three equivalents of base. He first determined the amount of carbonic acid set free by arsenious acid from alkaline carbonates, and found that at a temperature of 212°F., if the arsenious acid were in excess, two equivalents of arsenious acid displaced one equivalent of carbonic acid; but with excess of the carbonate, one equivalent of the acid displaced two-thirds of an equivalent of carbonic acid. At a red heat a similar result was obtained with excess of acid, but with excess of base one equivalent of carbonic acid was displaced. The action of the acid on the hydrates of the alkalies was next investigated; but under these circumstances the acid was oxidised, hydrogen being evolved. Salts were then prepared by mixing solutions of arsenious acid and alkalies; in this manner the crystalline salt, KO,HO,2As O_3+Aq. was formed; the water of crystallisation could be driven off at 212°F., and at a higher temperature the remaining water disappeared, and a biarsenite remained in a beautifully transparent state. A sesqui-arsenite, 2KO,

$3AsO_3+3HO$, and the corresponding soda salts, were obtained in a similar manner. The silver salt was tribasic, amorphous when first precipitated, afterwards becoming crystalline. There were three lead salts, a monobasic and bibasic salt, and a third which was obtained from an acid solution and had the composition, $3PbO,3HO,2AsO_3$. The zinc salt was tribasic, even when deposited from an acid solution, and under the microscope was seen to consist of a number of *spheres*. The magnesia salt, $2MgO,HO,AsO_3+Aq$. the copper salt, $2CuO,HO,AsO_3$, and the baryta salt, $BaO,2HO,AsO_3$, had also been prepared.—*Chem. News, London, June* 7, 1862.

ON THE ARSENIFEROUS SULPHUR FROM THE SOLFATARA OF NAPLES, AND PREPARATION OF SELENIUM.

By Dr. T. L. Phipson, F.C.S.

This sulphur is of an orange color, only partially soluble in sulphide of carbon, differing in this respect from the crystallised sulphur of Sicily, which I find to be totally soluble in sulphide of carbon. It contains both selenium and arsenic; the latter in considerable quantity. The following is the analysis of an average sample:—

Sulphur	87·600
Arsenic	11·162
Selenium	0·264
	99·026

Or,

Sulphur	80·458
Sulphide of arsenic, AsS_3 .	18·304
Selenium	0·264
	99·026

When heated in a platinum capsule it almost entirely disappears, leaving only a slight trace of a black substance, insoluble in nitric acid, and giving the reaction of silica before the blow-pipe.

Of the 87·600 of total sulphur contained in this substance, 64.26 dissolve readily in *aqua regia*, but the remaining 23·34

per cent. resist the action of *aqua regia*, and were not dissolved after boiling with excess of the latter for upwards of two hours.

The preparation of selenium from this impure sulphur is not difficult. The substance being finely pulverised, is oxidised by *aqua regia*, the solution diluted and filtered, thus separating the sulphur which remains undissolved. A few crystals of sulphite of soda are then dissolved in the liquid, until the latter acquires a permanent odor of sulphurous acid, and the whole allowed to repose for about forty-eight hours, at the expiration of which the whole of the selenium is deposited as a rose-red powder. In this manner from 0·3 to 0·4 per cent. of selenium can be obtained; but if, instead of using *aqua regia* to oxidise the sulphur, the latter be treated with carbonate of soda, and nitre, in the dry way, no selenium at all is obtained.—*Chem. News, London, June* 21, 1861,

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PREPARATION OF VERMILLION.

By M. Ringaud.

M. Ringaud has patented in France the following improvements in preparing this pigment:—

1. Washing with nitric acid to take out excess of sulphur and oxides of mercury.
2. Washing with solution of a mixture of sulphate of potash and caustic potash.
3. Digestion of hydrochloric acid.
4. Boiling in solution of caustic potash, which gives it a more or less violet tone.

The advantage of washing with acids is already known, but the treatment with alkalies is new.

The vermillion prepared by M. Ringaud, after being treated by the various solutions in the systematic order given above, is said to be of unprecedented beauty.—*London Pharm. Journ., May*, 1862, *from Journ. de Chimie Médicale.*

OIL OF CAJUPUT AS A MEANS OF DISTINGUISHING BETWEEN AMBER AND COPAL.

By Harry Napier Draper, F.C.S.

Several oxygenated volatile oils, notably those of lavender, rosemary and peppermint, possess the property of softening copal resin in the cold, and of dissolving it at higher temperatures, to a greater or less extent. Oil of cajuput, however, readily dissolves copal at the ordinary temperature, forming a perfectly transparent solution, from which the oil evaporates, leaving a very brilliant coating of the resin. Amber is totally insoluble in oil of cajuput, even at the boiling point of the latter; and, as some of the specimens of copal often simulate and are mistaken for amber, this different behaviour may serve as a ready means of distinguishing between the two resins. I may add, as a fact also possessing some technical interest, that the solution of copal in cajuput oil is easily miscible with alcohol.—*Chem. News, London, April* 5, 1862.

THE CONVERSION OF LACTIN INTO OXALIC ACID BY MUCEDINOUS FUNGI.

The following letter from Mr. E. M. Rimmington, Bradford, appeared in the *Lancet* of May 10th:—

Whilst engaged in repeating the experiments of Pasteur respecting spontaneous generation, I have been led to the discovery of a very singular and unexpected metamorphosis in milk by the agency of a mucedinous fungus; the conversion of the lactin into oxalic acid, and consequent formation of oxalate of lime. Believing this to be not only an interesting but an important fact (from its bearing on some other questions,) and having fortunately preserved a record of the experiment, I am enabled to give the entire history of it.

On the 17th of September of last year I poured into a test-glass some milk which had been previously boiled and kept in a flask some months; the milk at the time being perfectly sweet and good. The glass was then tied over with writing-paper and set aside. In the course of eight or ten days afterwards, a few

white tufts of mucor appeared, and gradually spread over the whole surface; the mycelium, as the growth proceeded, penetrating deeper into the fluid, the volume of which slowly diminished as it became consumed by the vegetation.

After the lapse of some months, there commenced at the surface of the milk, and at the under surface of the stratum of floccose mycelium, a zone or stratum of fluid of light-brown color, which slowly increased to a deep coffee-brown. It also increased in amount, until the whole fluid was involved in the change. At the time, I attributed this discoloration to some putrefactive decomposition, and did not examine it. The glass and its contents remained in the window of the laboratory, unnoticed, and uncared for, until a few days ago, when I thought it time to put it to some more useful purpose. Before carrying this intention into execution, it occurred to me that, after keeping it nearly twelve months, it would be as well to examine the ultimate result of the changes it had undergone.

The original quantity of milk was about three ounces; of this, only two or three drachms was left at the bottom of the glass, which, as before stated, was of a dark coffee-color, quite free from smell, and neutral. I decanted it into another glass, and then observed a crystalline sediment. Some of this I proceeded to examine with the microscope, and found it to consist of crystals of oxalate of lime in large and beautiful octahedra and dumb bells. On examining a portion of the mycelium, I found it full of similar crystals, entangled among the filaments and apparently adherent. The entire quantity I obtained may be one or two grains, but sufficient to supply many microscopic specimens. If any gentleman feels sufficiently interested to desire to verify my observations, a specimen will be forwarded on application per letter with stamps for postage.—*London Pharm. Journ., July*, 1862.

SULPHITES AND THEIR USES.

It is stated by the Florence correspondent of the "Medical Times and Gazette" (June 14,) that a new series of salts have been tried with success by Professor Polli.

The following is a short description of these new remedies:

"1. The sulphite of *soda* is soluble in water, and of an unpleasant taste; dose ʒj. to ʒij. per diem. A solution of 1 to 10 grains may be used for lotions.

"The bisulphite of soda is also soluble, but its taste is so bad that it should only be used externally, dissolved in ten parts of water.

"The hyposulphite of soda is soluble, and of tolerable taste, Dose gr. x. to ℈ij. per diem.

"2. The sulphite, bisulphite, and hyposulphite of *potash* are all soluble; but only the last-mentioned should be administered internally, in doses varying from gr. v. to ʒj. per diem.

"3. The sulphite of *magnesia* is the most soluble of all sulphites, the richest in sulphurous acid, and the least unpleasant to the taste. ʒss. ʒij. may be given per diem in ten-grain doses.

"The bisulphite and hyposulphite would be equally suitable for internal use, but are better dispensed with, as they are, by air and moisture, rapidly changed into sulphite of magnesia.

"4. The sulphite of *lime* requires 800 parts of water for solution, while the bisulphite and hyposulphite are easily soluble. These three salts have been given in doses of only gr. iij. to gr. vi. per diem. Signor Polli recommends them in the purulent stage of consumption, where they are, according to him, apt to check the absorption of purulent matter, and to favor the cicatrization of vomicæ.

"5. Lastly, the sulphite, bisulphite, and hyposulphite of *ammonia*, are all very deliquescent, and of a pungent taste. They are easily changed into sulphates, and can only be used externally.

"All the sulphites which can be administered internally, may be given either in powder, mixed with sugar, and flavored according to taste; or in edulcorated solutions. The sulphite of magnesia and the three salts of lime are preferable for internal, the others for external use. The hyposulphites in general have been found to act most slowly, inasmuch as they must first pass into the state of sulphites. They are rapidly decomposed by vegetable acids, but not altered by acetic acid, whence Signor Polli concludes, that during their use all kinds of fruit should be avoided, while vinegar may be allowed."—*London Pharm. Journ. July*, 1862.

POISONING BY ANILIN.

The following is recorded by Samuel Knaggs, Esq., M.R.C.S., in the "Medical Times and Gazette" of June 7th, 1852:—The man, who was thirty-nine years of age and healthy, was employed in some chemical works in Huddersfield. About noon he was directed to empty four carboys of the nitrate of benzole into a still; and by mistake the last one contained anilin, which is made from the nitrate of benzole. On lifting this carboy, it struck against the edge of the still, and broke: the contents poured over him, and into the ground beneath. None got into his mouth, but the fumes were very freely inhaled. Being anxious to conceal this accident from the knowledge of his employer, he worked hard to remove all traces of it; but in about an hour he was compelled to desist, for "he broke out into a sweat, and felt quite giddy and weak in the head and stomach." He then sat down for half an hour, and walked into the open air and had some tea. Afterwards he returned to the still and again tried to scrape up the spilt aniline, but the fume was too much for him. He felt very ill and unable to work; but he stayed till about five o'clock, when he walked across the road to his home, and went to bed immediately, "feeling very bad in his head and chest." He gradually got worse, and about nine o'clock a medical man saw him. At 11 p. m. I received an urgent message, begging me to come immediately, as he was dying. On entering his cottage I found him in bed apparently at the last gasp. His face and whole body was of a livid, leaden hue; the lips, gums, tongue and eyes of a corpse-like bluish palor; he was taking a gasping breath, as I thought for about the last time. I poured instantly two ounces of brandy down his throat, and then used cold affusion liberally with very good effect. After this, I had his chest, legs, and thighs covered with mustard plasters, and for three hours he took ℥ss. of brandy every quarter of an hour, and at the seventh minute a strong dose of ammonia and chloric ether; whilst with every third or fourth inspiration I made him inhale strong ammonia. During all this period there was no convulsion: he was perfectly sensible, and able to give a correct account of his feelings, and of the accident. His pulse was extremely small and irregular; but it be-

came fuller under the use of these means, and reached 130. He complained only of the pain in the head and chest, and latterly of the mustard. At the end of three hours the sinapisms were removed, and though the mustard was very good the skin was not at all reddened. I then left him for the night, ordering ʒss. of brandy to be given him every half hour, to alternate as before with the ammonia and chloric ether, and to inhale ammonia frequently. This plan was pursued throughout the night, and by the next morning his livid hue was fading, and he soon got quite well again. The legs, however, being blistered and painful from the mustard, kept him in bed for some days.—*London Pharm. Journ. July* 1862.

THE TRADE IN LIQUORICE.

By P. L. Simmonds, F. S. S.

The increasing importance of the trade and manufacture of Liquorice, induces me to pen a few remarks on this article of commerce. The consumption in England has hitherto been about 1200 to 1500 tons a year, but in North America the consumption had reached 4000 to 5000 tons per annum previous to the war. The reason why so much more was consumed in the States than in England was the much lower rate of duty imposed, and its extensive use in manufacturing tobacco,—liquorice juice being found not only an excellent preservative to the leaf, but also beneficial in mitigating the evil effects arising from the extensive practice of chewing and smoking carried on there.

The chief obstacles to extended consumption in England have hitherto been the high price, the high rates of duty, and the great impurity and adulteration of both foreign and home-made sticks and piping. Henceforward the consumption is likely to increase enormously in the United Kingdom, liquorice-paste having fallen in price from 90*s.* to 45*s.* under the influence of the removal of the duty by Mr. Gladstone, and the cessation of demand in America. Liquorice sticks, the best that can be made from Spanish and Italian root, are now sold at 100*s.*, and a very good pure article at 60*s.* to 70*s.* made from Levant roots.

According to the experiments of Overbeck and others, the better sorts of liquorice contain from twenty to forty per cent. of foreign substances, which remain behind as sediment, some of the lower qualities having as much as eighty per cent.; hence it would seem that the manufacturers add some powder to the liquorice in order to keep it dry. Besides the proportion of soluble extract, the color and taste may also serve as tests for the quality of commercial liquorice. The solution of some inferior qualities is dark-colored and sooty, and the sediment blackish-brown; whilst that of the better qualities is light-brown, and can easily be extracted. The best sorts of liquorice-juice from Calabria are obtained from Martucci, Ferrara, and Cassano, provided with their stamp; these sorts contain 62 to 67 per cent. of soluble extract, and 17 to 26 per cent. of insoluble dry residue.

Two species of *Glycyrrhiza*, or liquorice, have been employed on account of the sweet underground stem, called liquorice-root: these are *G. glabra*, common or smooth liquorice; and *G. echinati*, echinate podded liquorice. The rhizomes furnish, on decoction, a dark-colored extractive matter, containing a large proportion of sugar. This is inspissated by boiling to a consistency for rolling into paste, when it is wrapped in bay-leaves, and put into small boxes of a half to one cwt. for confectionery purposes, commonly known as Spanish-juice, or Solazzi.

The root of this plant is the useful part, being replete with a sweet, balsamic, pectoral juice, which is either extracted, or the wood sold in substance. It is much used in all compositions for coughs, sore throats, and as a demulcent pectoral; but by far the greatest quantity is used by brewers. The common liquorice is cultivated in most countries in Europe for the sake of its roots, but in Spain and Italy, and particularly in Sicily and Calabria, it makes a considerable article of commerce with this country. In Calabria, liquorice is chiefly manufactured and exported from Corigliano, Rossano, Cassano, and Palermo. The Calabria liquorice upon the whole is preferable to that coming from Sicily, and the Italian paste to that coming from Spain. Liquorice also grows in great abundance in the Levant. The boiling requires the utmost care and precaution, as the juice takes an unpleasant smell and flavor, if burnt in the least degree.

This paste is manufactured from the month of November till March, the warm season being very unfavorable for it; so much so, that it is not advisable to ship any in summer, as it easily runs into one mass in the boxes, and then is only to be sold for damaged liquorice. The round sticks are preferable to the flat ones, and the good quality is to be brittle, bright, without pores, and of a good fragrant smell.

In this country about fifty acres are under culture at Mitcham with the smooth liquorice, and much more at Pontefract. Twenty cwt. of root per acre may be reckoned a fair crop. The expenses of taking up the root by the fork costs £10 to £16 per acre.

The same ground will answer for liquorice for many years in succession, but it requires a plentiful supply of manure. No return is obtained until the third, fourth, or fifth year. The roots are usually taken up with a three-pronged fork, and stacked in trenches until wanted. The stacking is effected in a moderately dry and sheltered place, the roots being placed upright, with layers of earth between them, and a layer of several inches thick on the top. In this manner the stock is preserved in good order for several months. They are taken out when wanted, by hundredweights, and before being sent to London are deprived of their crowns by chopping. The fibres and small branches which are removed in trimming are called *offal*, and were formerly dried and ground to powder, and much used by chemists for rolling pills, in order to give consistency and substance to the compound.

This well-known vegetable product was equally familiar to the ancients, who also used it medicinally. Under the name of Pontefract cakes, small liquorice lozenges, stamped with the arms of the town from whence they take their name, are still sold by chemists and druggists.

The foreign root is sometimes imported from San Sebastian and the Papal Territories into London and Liverpool in small bundles of 60 to 70 lbs. each, for the use of druggists. It is grown and manufactured to a considerable extent in the provinces of Seville, Valencia, and Catalonia, in Spain. The liquorice-root grows wild in many parts of Greece, and especially in the province of Achaia, at Corinth, Phthiotes, and Missolonghi,

in great abundance; its quality is considered very good, and has induced many to undertake its manufacture. But the number is now much reduced, owing to the cultivation of the land, which makes the root scarce. One manufacturer at Patras, Mr. George Congos, used to prepare yearly more than 40,000 oques of liquorice-juice. The Greek root is said to be sweeter than that found in Sicily and Spain, hence the juice contains a greater quantity of saccharine matter than that made in Calabria.

The following figures from the Official Trade Returns, show the sources of supply in 1860. The duty, which had been 18s. per. cwt. on Paste from British Possessions, and £1 on foreign make, from 1846, and £1 per cwt. on all kinds of juice from August 26, 1853, was abolished on March 7th, 1860:—

Liquorice Paste.

	Quantity. Cwt.	Computed. Value.
France	757	£2479
Spain	981	3372
Naples and Sicily	5707	19,780
Turkey	16,790	33,578
Other parts	829	2785
	25,064	61,994.

Liquorice Juice.

	Quantity. Cwt.	Computed: Value.
France	772	£2704
Spain	101	383
Sardinia	34	202
Tuscany	97	572
Two Sicilies	5663	32,807
Other parts	186	792
	6853	37,460

In France there is an extensive use of liquorice-water, in the promenades and public places, under the name of "Coco." Under the name of "Erqooss" it is also sold extensively as a drink in the streets of Turkey and Egypt, in the manner of sherbet. Liquorice is slightly laxative and cooling, anti-scorbutic, and, unlike other sugars, quenches thirst. The saccharine, or extract of liquorice, is of a very delicate character, and easily destroyed by burning or oxidation on boiling. Recently, under a patented process, the application of the vacuum pan, as in sugar boiling, has been attended with great advantage. The result is a much better article than that made by the rough processes in use in Spain and Italy.

The price of liquorice is very little guide to quality: some foreign brands, and some forgeries of the same, selling at 120s. to 150s., and even 170s., when perfectly pure extract of the root can be had for 50s., and sticks superior to any others at 100s.

Purchasers, to avoid being misled, should examine and satisfy themselves of the actual quality. A rough test, but practically sufficient for all purposes, is that of dissolving and filtering the solution to observe what deposit or sediment remains. The pure extract of liquorice of the shops sold under the name of refined liquorice, is prepared by dissolving it in water, straining and inspissating in the usual manner.

Caution is required on the part of the grocer, that he does not pay £8 per cwt. for an article of less intrinsic value, and containing less glycyrrhizin, or pure extract of the root, than can be obtained for 100*s*.

A new feature in the trade is the introduction of small sticks, weighing from one to one and a half ounce, sold at retail at one penny and one-half penny per stick, instead of those of larger weight (two and three ounces) sold at a sixpence per stick.—*London Pharm. Journ., July* 1862, *from The Grocer.*

CURIOSITIES OF LEECH CULTURE.

Many of those who have assiduously cultivated the leech have amassed handsome fortunes, the trade being very remunerative. A prosperous merchant, away in some far district of Poland or Wallachia, will keep some two or three hundred of the inhabitants of his district in full employment collecting for him, paying them on the best of all plans, according to their labor—viz., so much a dozen, according to the age and quality of the leeches which they bring to the depot. The animals must be all gathered before the heat of the day sets in, and at once carried home to the capacious reservoirs provided for their reception, where they are at once counted and paid for. Packed in clay or in bags, they are at certain seasons dispatched by fleet conveyances to Marseilles, or direct to Paris, change of horses on the way being insured, when necessary, by liberal payments. The mode of packing the leeches for transport is much the same in most of the breeding districts. Some are placed in boxes—first a layer of moist white clay, then a layer of the little animals, and so on till the chest is full. Some of the merchants pack the leeches in bags as soon as they are taken out of the marshes. Each of these bags contains about sixteen

pounds weight, and it is necessary that they should be hung up for a period till the water is all drained out of them, and then the animal rolls itself up into a kind of ball, and lies in a semi-torpid state till it is, perhaps, revived on its journey by a dip into some half-way pond. The boxes or bags containing the leeches are carried in light wagons divided into necessary compartments. Relays of horses and drivers are always kept in readiness at the various stages of the journey; but, notwithstanding the greatest care may be taken in their transport, immense numbers of the animals are killed. Severe frost or great heat is equally fatal to them.—*Pharmaceutical Journal, June*, 1862, *from Once a Week.*

ON THE DETECTION OF PICROTOXINE.

By John W. Langley, S. B.

The seeds of the *Menispermum Cocculus*, known in commerce by the name of Cocculus Indicus, or popularly as "Fish-berries," contain several active organic bodies. One of these, picrotoxine, is eminently poisonous, and, it has been asserted, possesses in small doses a distinctly intoxicating quality. From this cause, and because the addition of the berries to the fermenting mash enables the brewer to dispense with a large amount of the malt which he would otherwise use, they have been largely employed for the adulteration of ale and beer, so much so in fact that it was deemed necessary in England to pass a law prohibiting its use for this purpose. While the composition and properties of picrotoxine have been long known, no process has been hitherto discovered by which it may be detected with certainty and confidence, the only method now employed being the recognition of its crystals under the microscope.

When picrotoxine obtained by any of the methods usually given for its preparation is examined, it will be found to possess the appearance and many of the properties of the alkaloids with which it has been classed, but it differs from them in the essential particular of not combining with acids, but on the contrary, it manifests a decided affinity for bases, and behaves in many respects like a weak acid. Again it differs from them in the fact, that if a salt of an alkaloid is decomposed with potassa,

we can remove the organic base by ether from an aqueous solution, while the same course pursued with picrotoxine would fail to remove any of it from the water, it being positively necessary that the solution should be neutral or acid to enable the ether to dissolve it.

Picrotoxine is soluble in one hundred and fifty parts of cold water, but if a small quantity of caustic alkali is present it will readily dissolve in six or eight times its volume. When this solution is gently heated it becomes yellow, and on platinum at a temperature far below iguition assumes a brick-red color which is distinctive and quite unlike the shade produced by sugar under similar circumstances. Picrotoxine, like sugar and many indifferent organic bodies, possesses the property of reducing certain metallic oxyds. "It changes bichromate of potass to a fine green color." (Gmelin.) "An alkaline solution, of picrotoxine reduces sulphate of copper to the suboxyd." (Otto.) This property, however, is common to too many other substances to be at all distinctive. A far more reliable test is found in oxydation.

If dry picrotoxine and nitrate of potassa are rubbed together in a watch-glass, and a drop of sulphuric acid is added, no perceptible change occurs; but if a strong solution of caustic soda or potassa is poured upon this, a bright reddish-yellow color is communicated to the mixture which partially dissolves and causes the whole liquid to assume the same tint. In this way very minute traces of picrotoxine may be discovered, so small a quantity as $\frac{1}{5000}$ of a gramme, if pure, being detected with the greatest ease. When as small a quantity as this is used we see the color most distinctly by gently breaking the solid cake of sulphate of potassa which lies on the bottom of the dish; portions of the precipitate will then appear of a crimson or purple hue.

In applying this test it is best to add about three or four times the quantity of nitrate of potash that we have of substance to be examined, and to use no more sulphuric acid than is necessary to moisten the mass. The solution of potassa or soda should be made very strong, and enough added to ensure considerable alkalinity in the mixture after the neutralization of the sulphuric acid.

Other powerful oxydizing agents will produce the same result but not with equal facility; chlorine passed over the moistened crystals, slowly dissolves them, and if we pour the alkaline solution upon them we obtain the same color, or we may substitute chlorate of potassa for the nitrate, the objection to the use of this, however, will be found in its tendency to explode when coming in contact with the acid.

This color, however produced, is not permanent, but will slowly disappear with a rapidity proportioned to the amount of substance taken, but it will always appear with great distinctness when first adding the alkaline solution if any picrotoxine is present.

It is extremely probable that this color is produced from a trace of some nitrogenous body which pertinaciously adheres to the picrotoxine, as, on analysis, traces of nitrogen can be detected; but this body powerfully resists all attempts at separation, for when repeatedly crystallized the picrotoxine still retains a minute portion of it. It can be obtained perfectly free from nitrogen only by dissolving it in potassa, and precipitating it by acids. When thus prepared its properties are the same as before, with the exception of the purple color produced by oxydation and subsequent treatment with alkalies.

There is no substance at present known to the writer which gives this shade of color under these circumstances. There are two, however, which communicate a brownish-yellow to the fluid, and would, if present as an impurity, interfere with the distinctness of the reaction; these are sugar and strychnia; from the first we need suffer no inconvenience as it is perfectly separated in the ordinary method used for isolating the alkaloids; from the latter, picrotoxine is most completely removed by treating an acidulated aqueous solution of the two bodies with ether, the strychnia remaining as a salt dissolved in the water and the ether containing all, or nearly all, of the picrotoxine. To prove this the following experiment was tried. A quart of ordinary ale was divided into equal portions; into one 0·45 gram. of picrotoxine and a little strychnia were introduced, the other was unadulterated; both were acidulated with hydrochloric acid and agitated with ether; the ethereal solutions on evaporation yielded, in the first case, small microscopic crystals of picrotox-

ine mixed with a little extractive matter perfectly free from strychnine; the other yielded extractive matter alone. The test of sulphuric acid and nitrate of potash was then applied; the brownish red color was produced in the first case, in the second there was no change. To ascertain the readiness with which minute quantities of picrotoxine can be detected $\frac{1}{50}$ of a gramme of it was dissolved in a pint of ale; this was acidulated and treated as above; the ethereal extract furnished ample proof of the poison when tested.

In another experiment the stomach of a cat which had been poisoned was emptied of its contents so that only the picrotoxine absorbed by the coats of the stomach might be extracted. It was treated with alcohol and the solution evaporated to dryness. Acidulated water being poured on the residue, the picrotoxine and a little organic matter were dissolved; being now treated with ether and the solution evaporated, small crystals of picrotoxine were obtained, which, when tested, produced the characteristic red color. A portion of animal matter free from poison treated in the same way gave no discoloration.

In examining a liquid for picrotoxine it should first be rendered acid, then shaken with ether; the residue left on evaporation of the ether examined with the microscope for small prismatic crystals; if a few drops of sulphuric acid diluted with its volume of water are added in the cold, and there are alkaloids present, they will dissolve, only so much picrotoxine passing into solution as is due to the water present, about one part for one hundred and fifty of water. A few drops of an alkaline fluid will dissolve the crystals, and on applying heat the fluid will become first yellow and when more strongly heated will become brick-red. A small portion ground in a watch-glass with nitrate of potassa and sulphuric acid gives a solution which when rendered alkaline by potash or soda becomes a bright-red.—*Amer. Journ. Sci. and Art, July*, 1862.

MANUFACTURE OF ALUMINIUM.

We have repeatedly mentioned to our readers the progress of the manufacture of Aluminium since St. Claire Deville dis-

covered the method of obtaining it on a commercial scale. They have learned to forge aluminium, to file, roll, punch and to engrave it with any design the workman may select. The method of drawing it into fine wire has remained hitherto an unsolved problem, though not for the want of diligent efforts to accomplish it. The superintendents of the two manufactories of aluminium ingots, comprehending the importance of being able to draw this metal into fine wire have made great sacrifices to resolve the problem. They have applied to the manufacturers of gold wire both at Paris and at Lyons, but all their efforts have failed. The aluminium has so little density that its texture is at once broken up and it becomes as friable as glass, so that it leaves upon the draw-plate the superficial molecules which are in contact with the instrument.

The problem of drawing aluminium into wire has, however, just been resolved by M. Garapon, an artisan of Paris, who now conducts the operation in a truly workmanlike manner. He furnishes the aluminium wire at from 60 to 100 per cent. cheaper than silver wire of the same length. The price of aluminium is always about 200 francs per kilogram. For the purpose of drawing it into wire they commence with rods of aluminium of one metre in length and 12 millemetres diameter; these the inventor easily reduces to wires of the size of a hair and many hundred kilometres in length. These products appear in the London Exposition, where are seen articles of lace-work, such as epaulettes, embroideries, textile fabrics, entire head-dresses, with mounting and ornaments constructed entirely of aluminium. These articles are remarkable for their lightness, and they show that a novel manufacture has been created by the new process of drawing aluminium into very fine wire. For the details we must await the result of the London Exposition.—*American Journal of Science and Arts, July*, 1862.

ANTISEPTIC PROPERTIES OF AMMONIA.

By Dr. Richardson.

In a paper read before the Medical Society of London, Dr. R. states that his earliest researches were directed to the study of the antiseptic properties of gases, and recalled attention to the com-

munication he had made to the Society on this subject in 1850. His present inquiry and application of ammonia as an antiseptic commenced in 1858. His attention was then directed to the fact, that the presence of ammonia effectually arrested the oxidation of various bodies, and even prevented the action of ozone. Believing that by an extension of the same law animal substances exposed to ammonia could be prevented from putrefaction, he kept blood and portions of tissues in contact with simple ammoniacal vapor, and with results which were most remarkable. Blood in an ordinary stopped bottle, if charged with ammonia so as to give a faint ammoniacal odor, would retain its freshness and many of its properties for years. Animal structures in like manner placed even so as to be massed together in bottles containing ammonia vapor, would retain their freshness for an unlimited time. Dr. Richardson now showed the following specimens: The lungs of a calf which he had used for lecture purposes for six months, and which had been simply placed under a bell-jar, a little ammonia in solution being put over them from time to time; a pancreas which had been kept for eighteen months in a bottle containing twenty minims of ammonia solution; a kidney showing deep congestion, which had been removed sixteen weeks; a bottle of mixed specimens, including portions of intestine with enlarged glands; a bladder, the inner surface of which was injected; a uterus and ovaries and a pancreas, all of which had been preserved lying close in one bottle for sixteen weeks; also a portion of liver, which had been removed nearly three years; and a cancerous breast, which had been removed by Mr. Spencer Wells eight weeks before. The specimens all retain their freshness, and admitted of dissection and examination as in the recent state. The author then described the method of applying ammonia. It was necessary, in the first place, to trust to the ammonia alone: specimens that were exposed first to spirit and then to ammonia vapor were always spoiled. For the preservation of fluids, such as blood or milk, it was merely necessary to add the alkali in solution in proportion, say of twenty minims, of the strong solution to two ounces of the fluid to be preserved. For tissues the plan was to place the specimen to be preserved in a stoppered bottle or under a bell-jar, such as is used for wax flowers and ornaments,

to place in the jar with the specimen a layer of felt or lint, charged with from ten minims to a drachm of the liquor ammonia fortis, and then to close the vessel or jar secure from the external air. For a luting in such cases soap answered best, or a mixture of soap and red lead. After this description, Dr. Richardson pointed out the practical value of the method. 1st. In conducting post-mortem inquiries it did away with all occasion for hurry. It was now only necessary at an autopsy to be provided with one or more jars, each containing say a drachm of liquid ammonia. The jars might now be filled with specimens, and if the stoppers were put in with care the specimens would retain their freshness for weeks, and even their microscopical characters. The only peculiar change was, that if much fat were present, the alkali formed with it a kind of soap; a fact which explained the formation of adipocire in the dead subject undergoing slow decomposition. For forensic purposes this method of preserving animal structure was perfect, inasmuch as it added no mineral or poisonous matter, and yet secured the part to be examined free from change and from all offensive odor. Not only so, but important pathological changes, such as ulceration of intestine, could be kept under observation and submitted to any number of pathologists. He (Dr. Richardson) had found the system a very useful one, too, for lecture purposes, as it enabled him to show to his class real specimens of disease, such, for instance, as the scirrhous breast now going round, instead of casts or specimens softened, discolored, and indeed destroyed altogether by immersion in spirit. The last point to which Dr. Richardson drew attention had reference to the cause of the antiseptic power of ammonia. Ammonia being a product of decomposition had been looked on commonly as a substance provoking decomposition. But ammonia was truly the most powerful antiseptic known: it acted catalytically by preventing the union of oxygen with oxidizable bodies. An experiment was here performed illustrating this: half a grain of ammonia diffused through 40 cubic inches of air was shown to possess the power of entirely suspending the combination of oxygen with potassium on a surface of paper saturated with iodide of potassium, starch, and solution of oxygen, so long as the paper was presented to the ammoniated air; but so soon as

the paper was removed, the evidence of the combination, indicated by the formation of the blue iodide of starch, was presented. In preserving animal structures in ammonia, the same experiment was virtually carried out; the presence of the ammonia suspended the oxidation. There were other agents which effected the purpose, such as chloroform; but the fact that these agents were indifferently soluble in water rendered them much less effective as compared with ammonia, which combined readily with the water contained in the tissues, and so perfected the preservation to the minutest point. In conclusion, the result presented tended to throw a light on the influence of the ammonias as the producing causes of some diseases, and as the curative remedies in other diseases. The same rule that pertained to dead, pertained to living organic matter. Hence long exposure to ammoniacal vapor, by arresting oxidation, produced extreme anæmia and a low depraved condition of the system, altogether with reduced respiration, reduced appetite, reduced muscular power, and reduced energy. On the other hand, in cases where a rapid oxidation of the body was being determined attended with increase of heat and rapid disintegration of tissue, the administration of ammonia, by arresting these changes, became in judicious hands the most powerful and effective of remedies. It checked decomposition by its action on oxygen; it held the blood fluid by its solvent power as an alkali, and being volatile it inflicted no immediate injuries on the structures of the body.—*Amer. Journ. Med. Sci., July*, 1862, *from Med. Times and Gazette, May* 10, 1862.

FABRICATION OF SUGAR.

At the meeting of the Academy of Sciences of Paris held 14th January, 1861, M. Dumas presented in the name of M. Emile Rousseau a memoir on a means of purifying vegetable juices, applied to the making of sugar. In consequence of the immense importance of this work, we publish an extensive analysis of it, for which we are indebted to the kindness of the author.

In the juices of the saccharine vegetables, that of the beet being taken for an example, we find always two kinds of organic substances which oppose the extraction of the sugar. The first belongs to the group of albumenoid and caseoid matters. It

undergoes all the modifications which reagents exert upon the solutions of albumen and casein. The salts of lime, and lime coagulate it. But this latter, whether by its own proper alkaline action it dissolves a portion of the vegetable substance, and holds it in combination, as M. Frenay has lately shown; or whether it liberates potassa or soda, causes the juices treated by it to remain always alkaline after the action of carbonic acid. These two effects are even found united, and there results from them a subsequent change of the syrups, which is especially felt in the low products of the manufacture of sugar.

The second substance is a matter generally colorless as long as it remains in the cells of the plant; but very greedy for oxygen, coloring rapidly under the action of the air, modified very easily by oxidizing agents, so as to be either transformed into that well known brown substance which appears, when vegetable juices are evaporated, or entirely destroyed. This substance, indeed, when it is deprived of all the albumenoid matter, reduces by heat the salts of silver, the binoxide of mercury, &c. By the action of this last material, the solution even takes the natural tint which the juice possesses after long exposure to air.

These facts being established, the data of the problem of the simplification of the making of sugar may thus be stated: We must find, 1st, a substance, generally but slightly soluble, having the power of coagulating all albumenoid substances, without any injurious action either on the sugar, or on the health; which can easily be withdrawn from the juice in case a certain quantity should remain in solution; and finally shall be of low price. 2d, Another substance, of an oxidating power, so to speak, limited; which may by its action either destroy the coloring matter or transform it into the brown substance and then absorb it; in short, shall add to this absorbing action the innocuousness and the low price of the former.

Sulphate of lime in whatsoever state it may be, natural or artificial (raw or calcined plaster), is the substance which appears to me to fulfil all the above indications better than any other material which I have studied. It is neutral, a condition which I regard as indispensable: without action on the sugar, but slightly soluble: it unites to the conditions of harmlessness and low price, a most remarkable property of coagulating the

albumenoid matters of vegetable juices, of that of the beet in particular. This property is such that it requires but a relatively very small quantity of its solution to produce this effect. The operation of defecation can therefore be performed under these excellent conditions, and with but a small quantity of matter; the head is very firm, collects well, and the juice can be drawn off in a proper state of clearness. The sulphate of lime therefore removes perfectly all coagulable matter, but does not touch the coloring matter, so that after the separation of the head, the juice soon colors deeply.

Animal charcoal is almost without effect immediately after defecation; it removes only the matter which is already oxidized, for after its action, the juice whose coloration is much lessened, soon colors again. We want therefore an oxidizing agent which shall do in a short time that which the air produces at length, or which may so modify this substance as to destroy or absorb it. Among the numerous bodies which I have examined in reference to this point, and which I shall not now enumerate, the hydrated peroxide of iron presents superior advantages in all respects.

Thus, after having removed by the sulphate of lime all the coagulable matters of a saccharine juice, if we agitate it either cold or heated to a temperature which must never reach ebullition with hydrated peroxide of iron, the filtered liquor passes altogether decolored, and purified from almost all the foreign matters which it contained. Besides this, the peroxide of iron, by that property, which all chemists know it to possess, of absorbing the alkaline and earthly salts, removes the small quantity of sulphate of lime which remained in solution. Thus the juice which, after the defecation by the sulphate of lime, reduced the nitrate of silver, &c., causes no change in them after its contact with the peroxide of iron.

This juice, when it comes from a plant in the normal condition, is, after this purification, perfectly neutral to test-papers, and may be kept in contact with the air for several days without undergoing the slightest alteration or coloration, which proves that all the matters which could act as ferments have been removed. It boils very well, and does not color even by the action of heat. The syrup when concentrated to the proper point

possesses only that slight yellow tint which belongs to the purest syrups. It tastes well, is deprived of the saline and disagreeable taste which we find in all beet-syrups, and preserves a remarkable fluidity and limpidity. The crystallization takes place easily and the crystals are white.

As a final proof of the good purification of the saccharine juice by this method, if we add to a boiled syrup a proper quantity of water to bring it back to 25° or 30° of the areometer, and in that state mix it with a large excess of alcohol at 90°, no cloudiness or deposit takes place even after several days; it no longer retains a trace of iron.

Henceforth, the making of sugar is reduced to these manipulations only: heating the saccharine juice in a boiler with some thousandth parts of sulphate of lime (natural plaster is the best); all the coagulable matters unite in a firm head; the clear juice separated from this, is then stirred with peroxide of iron. After the separation of the oxide, nothing remains to be done but to evaporate the water; that is to boil down.

The hydrated peroxide of iron must be in the state of a firm paste. A litre (quart) weighs about 1145 grammes (2½ lbs.); it contains from 70 to 80 per cent. of water. The quantity to be employed varies with the juice; it is never more than 8 or 10 per cent of the juice, which amounts to 2 per cent. about of the solid matter, the rest being water. After its action on the syrup it takes a black color, shrinks and separates easily from the liquid. After it has been used, it is only necessary to wash it with warm water, after having left it exposed to the air, in order to give the organic matter which it has absorbed time to be destroyed, so that the deoxidized portion may take again the oxygen which it has lost. It may be used, as is seen, over and over again indefinitely, and requires but little expense for its regeneration. This fortunate property renders the question of the quantity to be employed of but little importance.

I will add in conclusion, that even now, its price is much below that of animal charcoal, for it may be supplied at 5 or 6 f. per 100 kilog. ($8 to $12 per ton), and this price will doubtless be much reduced hereafter.—*Journ. Frank. Inst., March*, 1861, *from Cosmos.*

(Continued from page 376.)

lead, because in a free state it is insoluble in water. We return now to the fourteen fluids.

It is self-evident that we have not to deal with the solutions of fourteen peculiar bodies. Several bodies may be contained only in one, or at the most two of these solutions, but another constituent may exist in six or eight of the fluids, and each contaminated with one or more constituents, and perhaps in one of these fluids quite pure. It is only by a number of reagents that the truth can be learnt. It is clear that the same reagent must be always applied to all portions of the fluids. For example, we add a few drops of a solution of perchloride of iron to a little of each of the fourteen fluids which have been taken for this purpose. In several of the portions there results an intense, in some portions a less intense, in other portions no coloration, or there results in some of these fourteen fluids a different coloration by this reagent to that of the remainder. In the same manner we add a second reagent to portions of these fourteen fluids, and so forth. By these means it may be ascertained how many different constituents are contained in the fourteen fluids. It may further be discovered by what means each of the constituents present can be separated from the remainder. The examination can only be conducted further by the aid of elementary analysis. By elementary analysis alone can the identity of a discovered body, separated from its accompanying constituents, be proved and established with a known body. The similarity of many reactions is so great with many bodies, that we should regard those as identical which elementary analysis shows us are very different bodies: for example, two members of a series of homologous substances which stand next to one another in the series, &c. On the contrary, bodies often appear different in many of their properties from a known body, while we by elementary analysis are taught that a complete identity exists, and the difference in many properties is due to impurities which are present in such small quantities, that they have exercised no noticeable influence on the result of the analysis.

§ 6.—*Quantitative estimation of the constituents.*

For the completion of a work on the analysis of vegetable substances, it is appropriate to describe the methods which are employed to determine the quantities of individual constituents which have been found in a plant or in a part of a plant. It is often of importance in pharmaceutical or technical relations to know correctly the quantity of one or more constituents of a vegetable substance, or more rarely those of a whole plant. Instruction for the complete *quantitative* analysis of a vegetable substance cannot be given at the present time, as scarcely a complete *qualitative* analysis of any one plant, or part of a plant, exists. It is self-evident that it is impossible to describe methods for the separation of bodies which are unknown, whose proportions of solubility are quite as unknown as their com-

binations, and of whose existence we know nothing. With vegetable substances also which contain only known bodies, a method for their quantitative determination cannot be supplied, because the bodies most known are still too little investigated with exactness to afford grounds for the construction of a method of separation from a knowledge of their properties, and the properties of their compounds. Another circumstance renders a quantitative estimation almost impossible, even when we know the means of separating the constituents from one another: namely, a complete exhaustion of a vegetable substance under examination is almost impracticable, because it is not possible to comminute a substance in such a way that each cell is broken and its contents exposed to the action of a fluid. There also always remains behind a quantity—sometimes greater, sometimes smaller—of the constituent to be estimated in the material under examination. It may be easily determined by an experiment how much quinine can be *extracted* from a sample of cinchona bark, while the difficulties of the experiment would be considerably increased to determine how much quinine is *contained* in such sample of bark, as a little quinine always remains in the bark. I believe that it is quite useless to give the methods here which have been devised to determine quantitatively one or the other constituent in a certain vegetable substance; for example, the starch in seeds or bulbs, the sugar of beetroot, the quinine in cinchona bark, &c. To conduct a quantitative analysis, a complete qualitative analysis must first be undertaken, and the individual constituents must be accurately studied, and not only must their relations to solubility and their combinations be known, but their decomposition products, the properties of the same, and the quantity in which they appear, &c., must have been correctly studied. In a particular case, a method for the quantitative analysis of an individual part of a certain plant may be devised when the troublesome and tedious labor above mentioned has been performed in that particular case. But it is not impossible to supply a general method for this purpose, because a single body previously unknown, when present with other well-known constituents, must always cause an alteration in the entire order of the analysis. The majority of quantitative analyses, of which we have no deficiency, are regarded as useless. They can only claim to be considered as qualitative analyses. Independently of pharmaceutical or technical bearings, which in particular instances may render desirable an approximately correct quantitative determination of one or the other constituent of a certain material, an exact quantitative analysis can only have for its object the construction of a true representation of the normal constitution of the parts of a plant. But this object has never been accomplished by an analysis, however correct. We are far from being in a position, from a dismembered analysis of an ash, to draw a valid conclusion on the normal soil constituents of a plant, and quite as far from being able, from the individual analyses which have been per-

formed with especial reference to its organic constituents, to form a conclusion on the normal composition of a plant or one of its parts. In such analyses, whether we find ten or thirty per cent. of sugar, is of no importance. We only learn by this estimation that ten or thirty per cent. of sugar are contained in a certain part of a certain plant under certain circumstances, but we do not learn whether this quantity of sugar remains constant under all conditions, or whether the quantity found is the maximum or minimum quantity of sugar, or whether it lies between both extremes. That which has been stated with regard to sugar is applicable to every other constituent. Whether with the increase of one constituent the quantities of a second and a third increase or diminish, this and the like are questions which remain unanswered. Quantitative analyses will only then afford us information—that is to say, will be able to teach us the normal constitution of a vegetable substance—when they have been performed, in greater number, with materials which have been collected from plants at certain epochs of their development, and from plants which, under various climatic relations, have been developed in various positions, and from plants whose age we know correctly, &c.

These investigations, which are necessary to afford information on the normal constitution of a single vegetable structure, would claim the industry of a chemist for years. Consequently, there is little prospect existing that we shall be in possession of the results of such investigations in our time.

On the grounds just explained, we have also no rule for judging of the correctness or incorrectness of the results of quantitative analyses, when several of them have been performed on one and the same material by several chemists, and when the quantities of the different constituents in the various analyses differ considerably. Individual exact quantitative analyses, consequently, in proportion to the time and labor bestowed upon them, are of such little service, that it is advisable to neglect them. Under some circumstances the quantitative estimation of a constituent in a material may appear constantly necessary, to determine accordingly its value as a medicine or an article of commerce. Estimations of that kind of constituent, with the neglect of all others, possess proportionately little difficulty, and the corresponding method may be easily devised when a good qualitative analysis lies before us.

With regard to these quantitative estimations of individual constituents, attention may here be directed to circumstances of particular importance. The knowledge of the constituents of a material to be examined teaches us frequently that it is quite impossible to separate two constituents from one another in such a manner that one of them can be obtained pure without any loss. In such cases, or also when the separation can only be accomplished by tedious operations, the possibility of the *indirect estimation of a constituent* deserves our attention. This method for the estimation

of a constituent is by no means new. For a long time we have known how to estimate the contents of sugar from the quantity of alcohol which is obtained by the fermentation of the sugar. We have had processes for the estimation of starch from the quantity of sugar which can be produced from starch by various agents. Indirect estimations of this kind are often very easily performed in cases where a direct determination is endlessly difficult, or quite impossible. To estimate the quantity of caincic acid in the roots of *Chiococca racemosa* belongs to the impossible; the caffeo-tannic acid cannot be so exactly separated from the caincic acid, that the latter is obtained pure without loss. The caffeo-tannic acid mixed in its watery solution with hydrochloric acid and heated, does not give an insoluble or difficultly soluble decomposition product, but simply caincic acid. When a mixture of both substances is treated in the heat with dilute hydrochloric acid, the decomposition product of caincic acid is easily obtained, and its quantity can be estimated. This product is very difficultly soluble, but not insoluble, in the fluid from which it has separated. We know, by the examination which has been made, how much per cent. of the difficultly-soluble decomposition product is afforded by the pure caincic acid, and we know the solubility of this decomposition product as well as the quantity of fluid, consequently know the quantity of the decomposition product which remains dissolved therein; and thus we can estimate, in a short time, the quantity of caincic acid with the greatest facility and exactness. Indirect determinations of that kind may be performed, in a number of cases, without any difficulty and in a very short time. The correction first employed by Fresenius in mineral analysis for the solubility of difficultly soluble precipitates must not be passed over here without attention being drawn to it.

MICROSCOPIC EXAMINATION WITH THE AID OF REAGENTS.

Repeatedly the assertion has been made, that a chemical analysis can only be considered as completed when it not only enables us to learn the constituents of a vegetable substance, but, with the assistance of the microscope, renders us so experienced that we know in which form, and at what place, to find the individual constituents in the material under examination, and make out whether they are in the form of crystals or in the form of amorphous masses, or exist in a dissolved form in the contents of the cells, or as a constituent of the walls of the cell; also the density of its layers, and so forth. It is certain that we can only then say we know a plant or its parts when our investigations in chemical and anatomical directions are equally complete, and at the same time consolidated to a whole. But the assertion quoted is decidedly untrue from a chemical point of view, if correct from a botanical or a vegeto-physiological one. The chemical investigation has only to teach us the problem what constituents a plant contains, and in what quantities which naturally fluctuate between two certain extremes.

Whatever relates to the place in which a constituent exists is certainly not a chemical question, even when it lies in the nature of things that with chemical assistance, or perhaps alone, or at least more easily and certainly than without such assistance, this question can be answered.

In physiology, in geology, and other sciences, there is an abundance of problems which only those are in a position to solve who possess a certain sum of chemical knowledge. On this account, these problems are merely physiological or geological ones, and the physiology or geology is, on this account, no chemistry, although when not studied with chemical knowledge, they are less essentially advanced. When the chemist takes the arithmetical mean of the results of three elementary analyses, he is not necessarily an arithmetician, although he must have learnt to calculate to perform this operation; and when a chemist arrives at the remarkable idea of calculating the mean of his analysis according to the method of the smallest quadrate, nevertheless he is not a mathematician. The mineralogist is not a chemist when he tests a mineral with the blowpipe.

To return to the microscopic examination with the aid of reagents. It will be self-evident that it can only be undertaken when a correct qualitative analysis has already been performed with the material under examination, and the behaviour of the individual constituents with reagents has to be inquired into with exactness. It is also self-evident that we cannot conduct an examination of that kind with five or six reagents, as some persons still appear to consider at the present day. We must have confidence in the idea that we must test under the microscope in the same manner as without it. No one believes that simpler methods are employed in such chemical analysis, and that several reagents can be used when spectacles are worn. But a microscope is nothing else than spectacles which permit us to observe things which we are not able to see with our naked eyes on account of their smallness; it saves us chemical operations and chemical reagents quite as little as the spectacles of a short-sighted or long-sighted chemist are in a position to spare him such things. What we see under the microscope with the aid of reagents is only understood when we have been able, by a previous analysis, to know with precision the constituents. Whoever endeavors to learn anything under the microscope with the aid of reagents without a previous analysis and without a preliminary study of the constituents, is like a man who strives to read a book which is written in a language unknown to him, and therefore unintelligible to him with the assistance of lens. The result is precisely the same. He will know as little after the labor has been done as he did before the commencement. The vegetable anatomist is quite right when he endeavors to accomplish his object by the application of some few reagents, and facilitates and renders possible his observations, because by a few chemical agents he makes certain outlines appear more defined, or compels

some bodies to disappear, which prevent such observations. In chemical relations merely, nothing results from these observations, as bodies are present which behave towards certain reagents precisely as many hundred other bodies, some of which we know accurately, others very little or not at all. Of bodies which are colored brown by iodine, and such as are colored red by sulphuric acid with the addition of sugar, there is an innumerable quantity. From such reactions on certain bodies, to establish certain classes of bodies, is folly.

To give a method for the microsopic examination of vegetable substances whose composition has been previously ascertained with exactness, and whose constituents have been accurately investigated with regard to their behaviour to the various reagents, is at the present time an impossibility. We have a mass of difficulties therein to overcome, and the result of an investigation is frequently a doubtful when even a probable one, as we may have often and cautiously made observations, at least with regard to one or more constituents, when there was also frequently no difficulty in procuring certainty concerning other constituents.

§ 8.—*Conclusion.*

So far as was practicable in the present position of our knowledge, I believe that I have supplied a method for the examination of plants or their parts which does not easily permit a body to be overlooked which exists therein as a constituent. I believe, also, that by following the method given with some attention, suitable methods of separation can be easily devised to procure as many of the individual constituents as are necessary for the performance of a more minute examination of them, which will afford us again useful hints for devising improved methods of separation. When a minute examination of a constituent is intended, and consequently a sufficient quantity is to be prepared for this purpose, it is an unnecessary labor and a useless loss of time, when the order of analysis here described is pursued, to separate and prepare all the bodies which are contemporaneously present. We often attain this object very quickly when a certain quantity of the material is employed for the preparation of a constituent, and in this undertaking we have only a regard to this one constituent, and are disposed to sacrifice the remaining ones. This shorter and simpler method for the preparation of individual constituents can only be devised from the experiences which we have made by a systematic analysis, which has enabled us to learn all the constituents present, and given us the means to prepare smaller quantities of the individual constituent for the examination of its behaviour with other bodies, as far as it is necessary, to discover methods of preparation based on these experiences, which will enable us to procure larger quantities of the constituent for further investigation in the shortest possible time and with the least expense. When we have prepared sufficient quantities of all the constituents

in an approximately pure condition, the next problem is to completely purify these bodies. This completely pure preparation of bodies is attended often with no difficulty, as, for example, is the case with easily crystallizable bodies or with volatile bodies when they exist with non-volatile bodies, or even with volatile ones if in reference to their chemical characteristics they are widely different. Generally, bodies of the opposite character of an acid and a base are easily obtained pure when they are at the same time present with indifferent substances; likewise all bodies which are not *per se* crystallizable when they are capable of forming compounds, which can be readily obtained in a crystalline state. On the contrary, it is extremely difficult to completely separate indifferent amorphous substances when they exist mixed with one another, and to prepare in a state of purity the individual constituents of such mixtures. But the pure preparation is often not the greatest difficulty, but the establishment of the proof that the substance has been prepared in a state of purity. It is often possible to effect the pure preparation of a substance, but we have no index of the purity of the prepared substance. This is often the case with the amorphous and indifferent constituents of vegetables. There is frequently no other means for obtaining certainty with regard to the purity of a substance than by elementary analysis, conducted with portions of the substances which have been prepared in different ways from the same part of the plant, or where possibly taken from different parts of the plant. The complete agreement in the results of the analysis of the different portions of the same substance affords a proof of its purity. The individual constituents which we have prepared in a pure isolated condition are submitted to a further chemical examination. The elementary analysis of these substances combined with their reactions, will supply us with an evidence whether the constituent found is or is not identical with a body already known. A close examination, to the execution of which the previous analysis will afford assistance, will now teach us the constitution of the individual constituents. From this knowledge an insight is obtained into the connection between the individual constituents, that is to say, our investigation will afford results quite as useful for vegetable physiology as for chemistry itself. We secure an important advantage by these investigations, when we make the objects of our studies not only the various individual parts of a plant, but also the various individual parts in different epochs of their development. Observations on the formation of a body from one or several others will bring, most easily, light into the darkness in which the transformation of vegetable bodies is wrapped up. Correct analyses of plants, or rather of their parts, in their various relations, and their gradual development consequently, are a means to enlarge in a very productive manner, not only our chemical, but also our physiological knowledge. In the hope of having, by the present work on the analysis of plants and their parts, contributed something towards the accomplishment

of these aims, I submit these pages to the considerate judgment of the experienced chemist, and to the zealous student in this field of inquiry, who has had no opportunity from his own experience to devise a method for the analysis of vegetable substances. (See page 492.)

TENTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The meeting of this body, which was to have taken place at St. Louis, in 1861, but postponed account of on the national troubles, commenced its sessions at the Hall of the College of Pharmacy, Filbert street above Seventh, on Wednesday, August 27th, 1862, at 3 o'clock P. M.

The President, Henry T. Kiersted, of New York, called the meeting to order. James T. Shinn, of Philadelphia, Secretary.

Samuel M. Colcord, of Boston, P. W. Bedford, of New York, and A. B. Taylor, of Philadelphia, were appointed a Committee on Credentials, pending whose action the members were invited to enroll their names on the register.

The Committee on Credentials reported the following delegates from Colleges of Pharmacy, viz :—

From the Massachusetts College of Pharmacy.—S. M. Colcord, Henry W. Lincoln, Charles T. Carney, Thomas Hollis, and A. P. Melzar.

From the New York College of Pharmacy.—John Milhau, John Meakim, John W. Shedden, P. W. Bedford, Wm. Wright, Jr.

From the Maryland College of Pharmacy.—J. J. Thomsen, N. Hynson Jennings, J. Faris Moore, Jonas Winter, and J. Brown Baxley.

From the Philadelphia College of Pharmacy.—Samuel F. Troth, Daniel B. Smith, Elias Durand, Edward Parrish, and James T. Shinn.

The Executive Committee then reported a list of members elected in the interim, viz :—

Charles C. Thornton, Sharon, Miss.
Fairman S. Taber, Huntsville, Ala.
Edward R. Fell, Philadelphia, Pa.
Frederick A. Keffer, " "
A. S. White, Mount Holly, N. J.
Francis M. Basset, Brooklyn, N. Y.
John A. Niebrugge, " "
S. F. Conway, " "
George Peduzzi, New York City,
Bernhard Reinhold, " "
Adolph G. Dunn, " "
James S. Higgins, New York City,
Theobald Frohwein, New York City.
R. S. McMurdy, Albany, N. Y.
Thomas S. Maffitt, Boston, Mass.
Laban Beal, " "
Nathan F. Peck, Willimantic, Conn.
J. R. Carpenter, Calais, Maine.
George J. Waugh, Hamilton, C. W.
Robert J. Brown, Leavenworth, Kansas.
Andrew J. Tully, Cincinnati, Ohio.
John C. Gerhard, " "

The Roll was then called, and the names of those present noted by the Secretary.

The following named gentlemen were brought forward by the Executive Committee as Candidates for membership, viz:—

Wm. J. Allinson, Burlington, N. J.
W. Fisher, New York City.
A. W. Gabaudan, New York City.
William H. Macrea, Factoryville, Staten Island, N. Y.
Henry W. Lesley, Bristol, Pa.
David Howath, Andover, Mass.
Benj Gilpatrick, Jr., Boston, Mass.
Wm. H. Squire, Germantown, Pa.
Frederick Rollman, Philada., Pa.
Ferris Bringhurst, Wilmington, Del.

They were duly elected by ballot, Mr. Wright, of New York, and Mr. Parrish, of Philadelphia, acting as tellers.

The Report of the Executive Committee being called for, it was read by the Chairman, W. Procter, Jr., and laid on the table for future consideration.

The Report of the Committee on the Progress of Pharmacy being called for, the Chairman, J. M. Maisch, presented a voluminous report, which, after a few remarks, was laid on the table for future disposition.

Invitations from the Academy of Natural Sciences, and from Surgeon Thomas, of the United States Army Department of the Episcopal Hospital, to visit those Institutions, were received, and read by the Secretary, who was directed to return the thanks of the Association.

Reports of Special Committees being in order, that on "Adulterations" was called for. Wm. Procter, Jr., stated that the Chairman, Charles T. Carney, of Boston, had been ill for many months, and wholly unable to accomplish the Report; that two other members of the Committee had died since the last meeting, and the remaining members were unaware of Mr. Carney's illness until too late to prepare a Report.

Samuel M. Colcord, Chairman of the Committee on the sale of Poisons, stated that no report had been prepared, owing to the postponement of the meeting last year, and the uncertainty of there being one this, until May last, since which time his business engagements and domestic affliction have prevented it.

The object of the appointment of the Committee to promote the attendance of members at St. Louis, being defeated by the failure of that meeting in 1861, said Committee had no report to make.

It being now in order to appoint a Committee for the nomination of Officers to serve during the ensuing year, the delegations present selected the following gentlemen in accordance with a constitutional provision.

Samuel M. Colcord, of the Massachusetts College of Pharmacy.
P. W. Bedford, " New York " "
Edward Parrish, " Philadelphia " "
J. Jacob Thomsen, " Maryland " "

To whom the President added:

Ferdinand F. Mayer, of New York.
Ferris Bringhurst, " Wilmington, Delaware.
J. Faris Moore, " Baltimore.

After some discussion on the propriety of holding an Evening Session, which was not agreed to, the President read his interesting and suggestive Annual Report.

[This paper first dwells upon the state of the country, then refers to the reports of the Treasurer, Executive Committee, Committee on Adulterations, Committee on sale of Poisons, Committee on Deferred Business, special subjects referred to individuals for investigation, life membership and the suspended list; the report concluding with some feeling allusions to the national difficulties. Our space will not admit of a fuller notice.]

On motion, the Address was referred to the Executive Committee for publication. The meeting then adjourned until 9 o'clock to-morrow morning.

Second Session—Thursday morning, Aug. 28th, 1862.

The Association was called to order, near the hour adjourned to, by the President, and the minutes of the last meeting were read and adopted.

On motion of Edward Parrish, the Secretary was directed to engross in the Minutes extracts of letters from absent members to the Chairman of the Executive Committee, giving reasons for their non-attendance.

The Executive Committee reported the name of Edwin R. Smith, of Monmouth, Illinois, as a candidate for membership. A ballot being ordered, the tellers reported his unanimous election.

The Committee on Nominations reported the following names for officers and standing committees during the ensuing year,—viz.:

For President—William Procter, Jr., of Philadelphia.

For Vice-Presidents—John Milhau, of New York; Eugene L. Massot, of Missouri; J. Faris Moore, of Maryland.

Treasurer—Henry Haviland, of New York.

Recording Secretary—P. W. Bedford, of New York.

Corresponding Secretary—John M. Maisch, of Brooklyn, N. Y.

Executive Committee—Edward Parrish, Chairman, Philadelphia; Henry F. Fish, Waterbury, Connecticut; Wm. J. M. Gordon, Cincinnati, Ohio; Samuel M. Colcord, Boston, Mass.; P. W. Bedford, *Secy. ex-offi.*, New York City.

Committee on the Progress of Pharmacy—Ferdinand F. Mayer, New York City; W. Neergaard, New York City; J. Jacob Thomsen, Baltimore, Md.; E. W. Sackrider, Cleveland, Ohio; J. M. Maisch, *Cor. Sec. ex-offic.*

On motion a ballot was ordered for President and Vice-Presidents, when the tellers reported their unanimous election.

On motion of Dr. Squibb, the President was requested to deposit a ballot for the remaining officers and committees; the tellers reported that they were unanimous elected.

Mr. Kiersted now requested Mr. Procter, the President elect, to take the chair, in doing which the latter made the following brief remarks:

"*Gentlemen of the Association:*

"I believe that your partiality and personal good feeling has removed me from a sphere wherein I could operate usefully to the Association, and creditably to myself, to a position for many of the duties of which I am unqualified by ignorance of parliamentary usage. This much I earnestly represented to a portion of the Nominating Committee. In accepting, therefore, this chair, I will endeavor to perform its duties, and I beg you to remember what has been said, and be as charitable towards my short-comings as you have been liberal of your good will."

The Secretary then resigned his place to Mr. Bedford, the Secretary elect.

On motion of the Chairman of the Business Committee, the Report of the Executive Committee was brought up; when the Chairman of that Committee requested to amend the Report by inserting a paragraph which had been omitted in copying, relating to the plan of admitting new members in the interim between meetings, as directed in the Constitution. The request was granted. It was then moved that the Report of the Executive Committee be accepted and recorded in the minutes.

[This Report gives an account of the publication of the Proceedings of 1860, of their distribution, and of their cost. The aggregate expense of printing, engraving, paper, and binding 1000 copies is stated at $602.76. The expenses of distribution $51.35. The number of new members admitted in the interim was twenty-two, and seven deaths have occurred.]

The recommendation in the report regarding the mode of creating members in the interim, was now discussed. Dr. Squibb said that the present plan involved much labor, and thought the time had come when it would be proper to abolish the plan of admitting members in the interim. Mr. Parrish thought a better plan might be adopted, and suggested that a committee be appointed to consider this subject, and also the future disposition of the suspended list recommended in the President's annual address.

On motion, the Chair appointed Samuel M. Colcord, Edward Parrish, and J. J. Thomsen, to this duty.

The Treasurer's report now being in order, it was read by that officer, and on motion of Mr. Kiersted, was referred by the Chair to an auditing committee, consisting of Alfred B. Taylor and William Wright, Jr.

On motion of the Business Committee, the recommendation of the Treasurer in regard to the suspended list of members in arrears, was referred to the committee appointed to consider the subject of the admission of members, &c.

The report on the Progress of Pharmacy being called up, the Chairman, Mr. Maisch, proceeded to read such portions of it as would give the Asso-

ciation an idea of its contents and arrangement, which occupied a considerable time.

Mr. Parrish remarked in reference to the zeal and perseverance of Mr. Maisch, and moved that the report be accepted, and referred to the Executive Committee to be published in full, and that the thanks of the Association be presented to Mr. Maisch.

[This Report occupies 120 pages of manuscript, and differs from the previous Reports in having the subjects classified,—the materia medica under natural orders—the Pharmacy under the general heads of preparations, as powders, pills, mixtures, etc.—and from the portion read by the Chairman we infer not only that it is a valuable compend from the Journals, but that it has cost a great amount of labor and perseverance to complete it. It will be seen further on that the Association have manifested their approval of this Report by an honorary award of 50 dollars to the Chairman.]

The Executive Committee proposed for membership Daniel C. Robbins, of New York, and John C. Savery, of Philadelphia.

A ballot being ordered, the tellers reported them to be duly elected.

Mr. Maisch stated that Prof. Wiggers, of Gottingen, had sent to the Association "Canstatt's Jahresbericht," or Annual Report on the Progress of Pharmacy and collateral sciences in all countries, for the year 1860, in exchange for the volume of this Association, and remarked that the book contained little information of American Pharmacy, our Pharmaceutical Journals being but little known in Europe, except through the English Journals, which but rarely extract from them.

The Committee on auditing the Treasurer's Account reported that they had examined the account and found it correct, whereupon the report of that officer was adopted, and directed to be published in the Proceedings.

[The Treasurer reported a balance of cash in hand, after paying all expenses of publication, etc., for the last meeting, of $675.]

Mr. Parrish, after apologizing for so frequently speaking, desired to know when probably this session would adjourn, as it would be a suitable time to visit the Academy of Natural Sciences between the sessions. He also referred to an excursion up the Delaware, which it was proposed to carry out to-morrow afternoon, should the convention adjourn in time. He then moved that when this session adjourns, it shall be at 12¼ o'clock P. M., which after some discussion was agreed to.

The Chairman of the Business Committee brought up the matter of advancing the amount of the annual contribution, and moved that the subject be postponed until next year. Mr. Taylor stated that many of the members would soon be exempt as life members, and he desired to see that clause of the constitution altered, to prevent a failure in the funds of the Association.

No action was taken upon either of these propositions.

The Business Committee brought forward the following resolution which was passed:

Resolved, That the Chairman of the Executive Committee be authorized to employ a phonographic reporter and clerical assistance when necessary to carry out the details of publication for the Association; and that the Treasurer be authorized to pay the bills accruing therefrom.

The session then adjourned.

Third Session:—Thursday Afternoon.

The meeting was called to order by the President near the time adjourned to, when the Secretary read the minutes of the morning session, which were corrected and adopted.

Dr. Squibb of the Business Committee, brought forward a resolution to discontinue the Committee on Adulterations.

Mr. Colcord hoped the Committee would be continued.

Mr. Wright, of New York, thought the adulteration of medicines was sufficiently extensive to warrant such a Committee.

Mr. Mayer referred to Article 4th, Section 3d, of the Constitution, wherein the duties of the Committee on the Progress of Pharmacy are stated, and asked whether that Committee would not be sufficient to carry out the duties of the Committee on Adulterations.

Mr. Kiersted suggested that the title of the Committee should not be changed, as it was quite appropriate.

Mr. Parrish offered the following amendment to the resolution of Dr. Squibb:

Resolved, That the Committee on Adulterations be discontinued, and a Committee of five be appointed, to be called "The Committee on the Drug Market," whose duty it shall be to report annually the fluctuations in the supply and demand of drugs, the variations in quality, and adulterations and sophistications coming under their observation, or reported to them by others; and that they be authorized to make report on any adulterations and sophistications of immediate interest, through the pharmaceutical journals as soon as practicable after its discovery; and that all members are requested to furnish information of the kind required, to the Committee, without unnecessary delay.

Mr. Taylor stated his wish that the amendment would prevail, as it would be far more interesting. The Committee on Adulterations had never accomplished the intention of their organization.

Mr. Milhau stated that since the value of drugs had been so much enhanced, there was more sophistication than ever, and gave instances showing the need of being on our guard to detect them. He hoped that a Committee would be authorized, and that they be requested to report from time to time in the Journals of Pharmacy.

Dr. Squibb here withdrew his motion, when the Chair stated that the subject before the meeting was the resolution of Mr. Parrish.

Mr. Wright moved that the title of the committee, be the "Committee on Adulterations and the Drug market."

Mr. Wiegand thought the title sufficiently comprehensive to take in all that was necessary; that it was not needful to include articles out of our sphere of action. The motion of Mr. Wright having failed, the resolution of Mr. Parrish was finally brought up and after some little discussion passed unanimously.

Dr. Squibb here stated that the Business Committee (consisting of himself, Mr. Procter and Mr. Carney,) was not a standing committee, but organized last meeting on motion of Mr. Meakim to facilitate business at that time, and was directed to hold over till this meeting, to bring up unfinished business, and if thought advisable it would be better to appoint a new committee.

The question being taken on this suggestion, it was agreed to, when the President appointed the following gentlemen as the Business Committee for the ensuing year, viz: Dr. Edward R. Squibb, of Brooklyn, N. Y., S. M. Colcord, of Boston, and John J. Thomsen, of Baltimore.

The Chairman of the Business Committee now brought forward the matter of the general Index to the first eight volumes of the Proceedings, which Mr. T. S. Wiegand, of Philadelphia, was by resolution requested to prepare, and which had required much labor to complete. On motion the paper was accepted, and the thanks of the Association given to Mr. Wiegand for this laborious service.

Mr. Taylor suggested that it should be bound separately, and not incorporated with the volume of Proceedings, as it was no part of that.

Mr. Parrish moved that a committee of two be appointed to examine the Index prepared by Mr. Wiegand, and report at a future sitting, which was agreed to, and Messrs. A. B. Taylor and J. Faris Moore were appointed by the Chair for that duty.

The Business Committee then suggested that the Scientific Queries be now proceeded with, which was carried.

To accommodate Mr. Wiegand, who desired to leave, query No. 35, relative to Medicinal Spirits, was first called up, to which he read a reply, which was accepted and referred to the Executive Committee. To query No. 37, "on Commerce in Quackery," Mr. Wiegand stated that he had not been able to prepare a reply.

Query No. 1. Relative to Morphia and Opium Smoking. Mr. Procter verbally stated that he had experimentally commenced the subject as regarded the volatility of morphia, but that in regard to the precise conditions of heat in which opium is placed in the process of opium smoking he had been met by difficulties that had discouraged him from proceeding further, and that he had therefore abandoned the subject.

Query 2. Relative to Japanese wax—accepted by Thomas A. Lancaster, of Philadelphia, received no reply.

Query 3. On Oil of Benne (Ol. Sesami,) as a substitute for olive oil in pharmacy, was replied to by James T. Shinn, of Philadelphia.

Query 4. On the production of Tartar in the wine region of the Ohio valley, being called for, the President read a paper from Mr. W. J. M. Gordon, of Cincinnati, to whom it was referred, enclosing a letter from Mr. Graham, President of the Wine Grower's Association of the Ohio valley—both of which were referred for publication.

Mr. Maisch thought we should encourage the wine growers and dealers to save the tartar deposits. The dependence of this on foreign countries could be in time in great measure relieved if we take some action. We should address the Association, stating how important it was to them to save the tartar as a source of profit with but little trouble. Mr. Maisch was invited to produce the draft of a resolution and submit it at a future sitting.

Query 5. Relative to American Aconite root was not replied to by Mr. Tilden, of New Lebanon.

Query 6. On Arsenical Pigments, accepted by B. J. Crew, received no reply.

Query 7. Relative to a permanent solvent for Cantharidin, accepted by Wm. R. Warner, was not answered.

Query 8. On Garancin—directed to B. J. Crew, was not replied to.

Query 9. Relative to Chenopodium, received no written reply, but Mr. Moore stated that Mr. Balmer, who had accepted the question, had engaged in its investigation, but was not yet prepared to report, and requested its continuance to him, which was agreed to.

Query 10. Relative to the nature of the active principle of Capsicum, was not replied to by Mr. F. L. John, its acceptor.

Query 11. Relative to Conium seeds, referred to Mr. Fish, received no reply.

Query 12. Relative to the resinoid of Colocynth, accepted by John Faber, of N. Y., received no reply at the meeting, but subsequently a written paper (with specimens) was received by the President from Mr. Faber, and will be incorporated in the Proceedings on the authority of a resolution adopted later in the sessions.

Query 13. Relative to the Oil Wells of Pennsylvania, etc., accepted by G. W. Weyman, of Pittsburgh, being called up, Mr. Procter informed the meeting that the acceptor had investigated the subject, and had visited the oil region for that purpose, and was nearly ready to report, when the loss of his assistant, who had enlisted, prevented its completion and his appearance at the meeting, and therefore requested a continuance of the subject. Mr. Procter wished the paper to be published in the Proceedings if finished in time.

Dr. Squibb and Mr. Mayer objected.

Mr. Parrish advocated the suggestion.

Dr. Squibb, urged that previous action of the Association had required all papers for the Proceedings to be completed before presentation. Perhaps this was a special case. The object was to have perfect reports so

as not to delay the publication of the Proceedings. He therefore moved that the question be continued to Mr. Weyman for another year—which was agreed to.

Query 14. Was postponed for the present, Mr. Bullock being absent.

Query 15. The President read a reply to this query on cotton seed oil, from William J. Watson, of Brooklyn, N. Y., accompanied by two specimens of the oil.

Query 16. Regarding the therapeutic properties of Propylamin, accepted by Dr. Donnelly, was not replied to.

Query 17. Relative to a test for the genuineness of extract of Cannabis Indica, accepted by Mr. Procter, was not replied to, but the acceptor stated that his experiments were yet incomplete, and desired that he might have his results incorporated in the Proceedings if completed in time.

Mr. Allinson offered the following resolution, which was passed.

Resolved, That the Executive Committee be authorized to insert in Volume X. of the Proceedings, such essays in answer to queries as may be completed in season, and as may in their estimation possess sufficient present importance to render it desirable.

Query 18. Relative to Honey, referred to F. L. John, was not replied to.

Query 19. As to the best manner of dispensing phosphorus, was replied to by Mr. Faber in a paper received too late for the meeting.

Query 20. On the Veratrum Viride, was replied to by George J. Scattergood in a paper which elicited much commendation from Mr. Parrish and others, and several queries were put to the writer in regard to the chief points of his paper,—viz.: the fact that the sedative power of Veratrum viride is owing more to a resinoid matter accompanying veratria than to the veratria itself.

Query 21. On Copaiba, referred to Prof. Carson, received no reply.

Query 22. On the Cod-Liver Oil trade was not answered by Mr. Blatchford, of Rockport, Mass., to whom it was referred.

Query 23. Relative to Sugar-Coating Pills, etc., accepted by Mr. Stearns of Detroit, received no reply.

Query 24. Relative to Convolvulus panduratus, was continued to Mr. Lemberger, of Lebanon, Pa., at his request.

Query 25. Relative to Celandine, was continued to Mr. Bedford.

Query 26. On the tannin-value of our indigenous astringents was not replied to by W. R. Warner, its acceptor.

Query 27. Mr. Mayer was ready to answer this query, but wanted it postponed till to-morrow morning, on account of the light.

Query 28. On the statistics of the trade in Castor Oil being called up, Mr. Mayer stated that he had been promised full statistics by a person in the business, who had failed to produce them. A large quantity of this oil is made in Jersey City, but those engaged in it are not disposed

to give information. The seed is imported free of duty, the best being used for oil, and the refuse, with the cake from the press, for manure.

Query 29. Relative to the acrid principle of Castor Beans, was not replied to by Mr. Warner.

Query 30. What is the true botanical source of Southern Prickly Ash bark? Prof. Thomas, to whom this question was referred, sent no reply.

Query 31. On the influence of new remedies on pharmaceutical progress, was replied to by Edward Parrish.

The Committee appointed to examine the Index gave a report, which was adopted.

The Reporters say the Index will probably occupy forty-five printed pages, and they recommend it to be printed and placed at the end of the volume of Proceedings for 1862, but that it be paged separately, so that those who desire it may have the Index bound separately.

The Business Committee suggested that a Committee be appointed to examine the specimens on exhibition and report at a future sitting, which was carried. And the Chair appointed J. Faris Moore, George J. Scattergood and Ferd. F. Mayer to that service.

Mr. Parrish moved that a Committee of five be appointed to propose queries for the ensuing year. It was suggested and agreed to that the President act as Chairman of this Committee, and that he appoint the remainder of the Committee.

A motion to adjourn now prevailed.

Fourth Session—7½ o'clock P. M., Aug. 28th.

The President called the meeting to order and the Secretary read the minutes of last session, which were adopted

The President announced the following as the Committee to prepare subjects for investigation next year,—viz.: William Procter, Jr., John M. Maisch, Charles Bullock, J. Faris Moore and P. W. Bedford.

Query 32. On Anilin dyes, was not replied to by Mr. Weyman.

Query 33. On Tartaric acid and the tartrates. Mr. Maisch stated that he had devoted much time to this subject, and had made much progress with it, feeling interested in the researches, but that he had been so occupied in the preparation of the Report on the Progress of Pharmacy as to be totally unable to write out his results. He proceeded to give, verbally, a detailed account of them, and then asked that the query be continued to him till next year, which was agreed to.

Query 34. On the availability of the Tomato as a source of citric acid, was not replied to by Thomas A. Lancaster, of Phila.

Query 36. What course should be pursued by pharmaceutists in relation to adulterated liquors. Henry F. Fish, of Waterbury, Conn., in a letter addressed to the President, made a partial report on the subject.

The letter was referred to the Executive Committee, and the subject was continued to Mr. Fish.

Query 38. On the leaves of the Ricinus, was not answered because of the death of the acceptor.

Query 39. On Anacahuita wood, not replied to by Mr. Caspari.

Query 40. On the present sources of Senega and Spigelia, was replied to at the last session by Mr. Dohme in an explanatory letter.

Query 41. On the production of Elaterium in the United States, was replied to by Prof. Thomas, and the paper referred for publication.

Query 42. On pharmaceutical apparatus, was answered by Edward Parrish.

Mr. Bullock being now present, an answer to Query 14 was called for. He stated verbally that it was almost impossible to find wood creasote of authentic character, it being generally impure carbolic acid. The Messrs. Dupont had informed him that they ceased to find it profitable to make wood creasote when it was below $4 per pound; and also that their crude creasote was much more effective for burns than the present commercial article.

Dr. Squibb said he had used Merck's creasote for burns and deemed it excellent, which he felt sure was carbolic acid.

Mr. Bullock had had creasote, which was sold as wood creasote, that crystallized in winter.

Carbolic acid had been sent from London to the Surgeon's Department for use in the army as a disinfectant; and, when mixed with gypsum, as a disinfectant powder. But Crace Calvert says it is not a disinfectant, only antiseptic.

Mr. Parrish had had applications for odorless creasote from dentists, but could not get it, and wished to know if arsenious acid was soluble in that liquid. The dentists use such a mixture with morphia for destroying the dental nerves. Pure carbolic acid is not odorless.

Mr. Maisch thought Merck's creasote was from wood, as there is no coal region near him; but at his prices it could not be made from wood, and coal tar is easily transportable.

Query 44, to Mr. Shivers, received no reply.

Query 45. On Arnica, to Dr. Henry T. Cummings, was not replied to.

Query 46. On the American species of Cantharis, referred to T. Chapman Hill, was replied to in a paper read by the President.

Query 47. Dr. Squibb stated that he had no reply to this query relative to a pharmaceutical still, and wished to abandon the subject, yet he proposed in lieu to read a paper on a subject formerly given to him, relative to bleached morphia salts, which was read and referred for publication.

Mr. Wright stated that in a large hospital at New York, unbleached quinine was preferred, and Dr. Squibb had examined it and found it to contain more quinia than the white salt.

Dr. Squibb also read a volunteer paper on Scammony, which was accepted and referred for publication:

Query 48. On Arrowroot, was replied to by Evan T. Ellis.

Some general discussion ensued after reading this paper, on the subject of this fecula, in which St. Vincent Arrowroot was spoken of as equal in real value to the Bermuda variety, though of less commercial value.

Query 49, to Dr. Battey, elicited no reply.

Query 50. This query was read at the following session, it having been delayed by post.

Query 51, to Mr. Tilden, was not replied to.

Edward Parrish exhibited a small apparatus for testing the relative explosibility of different lots of coal oil to detect benzine.

The Chairman of the Business Committee brought forward a matter of delinquency of a Boston member, but action was postponed until to-morrow. It was moved and carried that when we adjourn it be till to-morrow morning at 9 o'clock.

The Business Committee brought up from the list of unfinished business the subject of an act of incorporation. and the committee appointed to report amendments to the drug law. It was moved and carried that the subjects be dismissed, and Committees be discharged from further service.

The Committee to report on a certificate of membership was indefinitely postponed.

The subject of offering prizes for valuable elaborate papers was then brought forward by the Business Committee from the last annual session, and after having been discussed, it was concluded that, at least for the present, the object of the Association could be attained by special resolution to meet the cases that might arise.

The following preambles and resolutions were then offered and unanimously carried:

Whereas, The Report on the Progress of Pharmacy having now necessarily embraced a period of two years, involved an unusual amount of labor; and whereas, the Chairman of that Committee has not only cheerfully given his talents, time and labor to the work, but has systemized and perfected the report to a degree which must reflect great credit upon the Association. Therefore

Resolved, That the Treasurer of the Association be directed to hand to the Chairman of the Committee on the Progress of Pharmacy, Mr. John M. Maisch, the sum of fifty dollars, as a prize offered by the Association in honorable recognition of his services in the report of this Committee; and that the thanks of the Association be and are hereby also given him.

Resolved, That a copy of this preamble and resolutions be given to Mr. Maisch by the Secretary.

Whereas, By resolution of the Association at its last annual meeting, it was decided to have a general Index of the Proceedings prepared up to the year 1860, and that a full set of the Proceedings were given to the member who should accomplish the work, as a complimentary prize for

the labor involved; and whereas it has subsequently appeared that a full set of the Proceedings was not in possession of the Association; therefore

Resolved, That in appreciation of the time and labor bestowed upon the general Index by Mr. Thomas S. Wiegand, the Treasurer be directed to procure a bound copy of Muspratt's Illustrated Cyclopædia of Chemistry, and present it to Mr. Wiegand, with the thanks of the Association, as a complimentary prize offered for the work accomplished by him.

Resolved, That a copy of this preamble and resolutions be sent to Mr. Wiegand by the Secretary.

On motion of Mr. Parrish, it was carried, that to-morrow, at 11½ o'clock A. M., be designated for considering the next place of meeting; when, on motion, the session adjourned.

Third day—Fifth Session, August 9th, 1862.

The meeting having been called to order by the President, on motion of A. B. Taylor, James T. Shinn was appointed Secretary *pro tem.*, during the absence of the Secretary.

On motion, a preamble and resolution were brought forward, read and discussed, relative to an individual, now a member, in Boston, who has prostituted the Certificate of the Association and the names of its officers to further the sale of his quack preparations, in violation of his written signature of agreement to uphold the objects of the Association, in article 1st, section 5th, of the Constitution.

After considerable discussion of the merits of the case, a vote on the resolution for expulsion was directed to be taken by ballot.

The Chair announced, on the ballot being rendered by the tellers, that it proved unanimous in favor of the resolutions, and the Secretary was directed to notify him of the action of the Association.

The Executive Committee reported the names of A. W. Newton, of Bristol, Bucks County, Pa., J. C. Hughes, of Pottsville, Pa., and George Y. Shoemakor of Philadelphia, as candidates for membership. They were balloted for and duly elected.

Mr. Maisch now presented the following preamble and resolutions, which were passed unanimously:

Whereas, It has come to the knowledge of the American Pharmaceutical Association, that the tartar produced from American wine, has hitherto been thrown away as valueless by the wine growers, therefore

Resolved, That we regard the production of tartar from American wine of great importance, on account of the extensive uses to which that product is applied in Pharmacy, domestic economy and the arts; that we believe that crude tartar and purified (cream of) tartar will always meet with a ready sale; and that the wine growers will advance their own interests and assist in developing the resources of American Agriculture by making the experiment of saving the tartar.

Resolved, That the Corresponding Secretary be directed to furnish a copy of this preamble and resolutions to the President of the Wine-growers' Association of the Ohio valley.

The Committee to whom was referred alterations in the Constitution in reference to membership, and the suspended list, reported the following resolution.

Resolved, That in view of the disturbed state of the country, the publication of the suspended list for the present year be omitted, and that the Treasurer be requested to correspond with those members. by circular or otherwise, and ascertain their views of continuing their membership for action at the next meeting.

Resolved, That it is inexpedient to make any alteration in the Constitution for the present with regard to admitting members during the year.

The question was taken on the resolutions separately, and each of them passed.

Mr. George C. Close, of Brooklyn, New York, now read a volunteer paper, on the use of Chestnut leaves for the Whooping Cough, and exhibited the dried leaves and a fluid extract prepared from them. The paper was referred to the Executive Committee for publication.

At the request of the President, Mr. Milhau, first Vice-President, occupied the Chair for the remainder of the session.

Mr. Mayer now proceeded to read his reply to query No. 27, on Phosphomolybdic acid as a test for alkaloids. Mr. Mayer illustrated his remarks by some experiments. The paper was referred to the Executive Committee for publication.

Mr. Procter now read the answer of Mr.Sharp, of Baltimore, to query No. 50.

Mr. Procter also read a letter from Mr. Dohme, of Baltimore, stating why his paper in answer to query No. 40, was not answered. On motion the latter was referred to the Executive Committee for publication if proper.

Mr. Procter stated that he had received a communication from William S. Merrill, of Cincinnati, in regard to the active principles of Hydrastis Canadensis, and though directed to the Editor of the American Journal of Pharmacy, the paper contained a request that it be submitted to the Association. He believed the paper would be proper for the proceedings by a charge of direction. It was accompanied by a number of beautiful specimens of Hydrastia Berberina, Xanthoxylin, Sulphate of Sanguinarina and other salts, by way of illustration. After some discussion the paper was not received, on the ground of its not being directed to the Association. Subsequently this action was reversed by the adoption of the following resolution :

Resolved, That the communication received by the President from Mr. Merrill, in regard to Hydrastis, &c., be referred to him (Mr. Procter) to be modified for publication in the Proceedings.

Alfred B. Taylor, Secretary of the Committee of Revision and Publi-

cation of the new Pharmacopœia, having at the request of the President prepared a few notes, gave an interesting outline of the Proceedings of that Committee during the two years and a quarter that it has been engaged in the work of revision, mentioning their action in regard to weights and measures, Percolation, Powders, and many of the preparations that had been introduced. Mr. Taylor observed that his remarks must be considered strictly verbal, and not to be printed in the Proceedings, as he was not authorized to do so.

The Business Committee now brought forward the subject of the next place of meeting, and offered a resolution, but after considerable discussion by Messrs. Colcord, Squibb, Milhau, Bedford, Kiersted, Procter, and others, the resolution was withdrawn, and the following offered by Mr. Colcord adopted:—

Resolved, That when this Association adjourns it shall adjourn to meet on the second Tuesday of September, 1863, at such place as the President and Executive Committee shall determine, due notice being given in the proper Journals.

The Committee on Specimens on exhibition, presented the following Report:

Among the preparations of a pharmaceutical character, we find most conspicious the fine collection of elixirs, wines, syrups, and glyceroles; the lozenges, pastilles, and other articles exhibited by Edward Parrish, of Philadelphia, who also exhibited an ingenious apparatus for the ready preparation of suppositories.

H. W. Lesley, of Bristol, exhibits preparations of blackberry root and berries, accompanied by an explanatory paper.

James T. Shinn, exhibits specimens illustrating his paper on oil of Benne.

Messrs. Powers and Weightman, of Philadelpia, are represented by a number of their finer preparations of the alkaloids of cinchona, and opium, and metallic chemicals.

Dr. W. H. Pile, exhibits a case of Hydrometers, Alcoholmeters, Thermometers, and other graduated instruments, which show the talent employed on, and the excellence of the manufacture. Edward Parrish exhibits a compact Gas Furnace for pharmaceutical purposes.

A neat nursing bottle is exhibited by Hastell & Letchworth; J. D. Lynde has a patent self-acting valve-stopper for ærated water-bottles; Wright, Smith and Piersoll, an ingenious apparatus for testing coal oils as to their safety for use in illuminating.

There is likewise on the table a fine collection of the Zinc ores used by the Lehigh County Zinc Company, of Pennsylvania, deposited by Prof. Robert Bridges.

J. F. Moore, Chairman.

The subject of a certificate of life membership was brought forward by the Business Committee as a recommendation of the late President, but the proposition was not agreed to.

At the request of the President, Vice-President Milhau announced the following as the Committee on the Drug Market, viz :

Edward R. Squibb, M. D., of Brooklyn, N. Y., *Chairman.*
William Procter, Jr., of Philadelphia, Pa.
Samuel M. Colcord, of Boston, Mass.
Charles Bullock, of Philadelphia, Pa.
Alphæus P. Sharp, of Baltimore.

The following Report of the Committee to prepare queries for investigation next year was now read by the Chairman as follows :

1. Is there a principle in Chenopodium anthelminticum analogous to Santonin, or does the medicinal power of this plant depend wholly upon its volatile oil ? *Continued to James Balmer, of Baltimore.*

2. Is there a crystalline active principle in Capsicum , or does it owe its pungency to a soft resin ?

Accepted by Edward Parrish, of Philadelphia

3. What progress will have been made during 1862—63 in the collection of tartar in the wine region of the Ohio Valley ?

Accepted by Mr. J. M. Gordon, of Cincinnati.

4. What is the relative activity of the root of Aconitum napellus grown in the United States, and that imported from Europe, based on their yield of Aconitia, and what objections, if any, exist to the economical culture of the plant in the United States ?

Accepted by William Procter, Jr., of Philadelphia.

5. What is the best permanent solvent for Cantharidin suitable for making a Pharmaceutical preparation for blistering ?

Accepted by J. Faris Moore, of Baltimore.

6. What are the advantages of the seeds of Conium maculatum, as regards uniformity of medical power, as a basis for the medicinal tincture ?

Accepted by George C. Close, of Brooklyn, N. Y.

7. The oil wells of Western Pennsylvania—the quantity and quality of oil they afford at present, their prospective value, and the geological characters of the formation wherein the oil is deposited.

Continued to George W. Weyman, of Pittsburgh.

8. Does wood creosote exist in the market ? to what extent ? and what are the objections to the substitution of the former by carbolic acid ?

Continued to Charles Bullock, of Philadelphia.

9. Has Propylamin as it exists in Ergot any power to produce uterine contraction ; and if so, does commercial Propylamin from herring pickle possess a like power ?

Referred to Prof Robert P. Thomas, of Philadelphia.

10. What is the relative proportion of tannin in the indigenous astringents of the United States, used for medicinal and other purposes.

Accepted by James T. Shinn, of Philadelphia.

11. What is the true botanical source of Southern prickley ash bark?

Continued to Prof. Robert P. Thomas, of Philada.

12. An essay on Tartaric Acid and the medicinal tartrates in their chemical and pharmaceutical relations.

Continued to Prof. John M. Maisch, of Brooklyn, N. Y.

13. What course should be adopted by Pharmaceutists in view of the present state of the liquor market, as regards factitious brandies and wines? *Continued to Henry F. Fish, of Waterbury, Conn.*

14. What is the best form and material for a still for use by pharmaceutists, of from two to four gallons capacity, appropriate for being heated by gas or stove heat, and which shall be suitable for the recovery of alcohol in making pharmaceutical preparations.

Accepted by William Procter, Jr., of Philadelphia.

15. What is the most convenient and economical arrangement by which the apothecary can quickly and reliably ascertain the strength of acid and alkaline liquids for pharmaceutical preparations?

Referred to Dr. Wilson H. Pile, of Philadelphia.

16. What is the best method of keeping garlic during the autumn, winter, and spring in the pharmaceutist's shop, so as to prevent its growth? *Accepted by E. W. Sackrider, of Cleveland, Ohio.*

17. What are the actual values of the commercial varieties of Buchu leaves, based on the proportion of volatile oil they will yield.

Accepted by P. W. Bedford, of New York.

18. It has been alleged that Ipecacunaha is now adulterated with Euphorbia Ipecacuanha, Gillenia trifoliata and other substances. What are the best means of detecting these adulterations of this important drug? *Accepted by William Wright, Jr., of New York.*

19. Why should not Lactucarium be economically produced in the United States for the supply of commerce?

Referred to Henry A. Tilden, of New Lebanon, N. Y.

20. An essay on the best practical means of protecting volatile oils from the injurious action of light and air in the apothecary shop, during the course of their being dispensed.

Accepted by Alfred B. Taylor, of Philadelphia.

21. An essay on the actual merits of Sanguinaria as a therapeutic agent based on trials with Sanguinarina and its salts; and its claims to a prominent position in the Materia Medica.

Referred to Prof. Robert P. Thomas, of Philadelphia.

22. An essay on Fluid Extracts—as regards their preparation, permanence, and eligibility as officinal preparations.

Accepted by William Procter, Jr., of Philadelphia.

23. What are the relative merits of White and Black Mustard for use as Sinapisms. *Accepted by Prof. J. Faris Moore, of Baltimore.*

24. On the pharmaceutical preparations of the Strychnaceæ (Nux Vomica, Ignatia Amara, &c.,) and on the methods in use for the extraction of their active principles. *Accepted by Prof. Ferd. F. Mayer, of New York.*

25. What is the constitution of the several impure Oxides of Iron used in medicine (as Sub-Carbonate, Iron Rust, &c.,) now in the market.

Accepted by Ferris Bringhurst, of Wilmington, Del.

26. What are the best methods of detecting the adulterations of olive oil? *Accepted by Jonas Winter, of Baltimore.*

27. Do any of the samples of sulphuric and other mineral acids of American origin contain appreciable amounts of Arsenic?

Accepted by Prof. John M. Maisch, of Brooklyn, N. Y.

28. The green sand or marl of New Jersey, according to analysis, contains among other constituents from 10 to 12 per cent. of potassa. Query. Can this potassa be economically extracted sufficiently pure for pharmaceutical and commercial use, so as to compete in price with that derived from wood ashes?

Accepted by George J. Scattergood, of Philadelphia.

29. Is the process of dialysis applicable in Pharmacy? If so, in what instances may it be employed.

Accepted by William Procter, Jr., of Philadelphia.

30. Observations on the "Internal Revenue Law," in its relations to the business of the druggist and apothecary.

Accepted by Edward Parrish, of Philadelphia.

The Committee also recommend the adoption by the Association of the following as *prize essays* for general competition; the prizes to be adjudged by a Committee to be appointed by the Association at its meeting in 1864.

1. For the best essay on Cimicifuga racemosa, in its chemical and pharmaceutical relations and medical uses.

2. For the best essay based on a practical and successful experiment on the culture and preparation of Elaterium in the United States, accompanied by a specimen of the product of not less than 120 grains.

Respectfully submitted,

WILLIAM PROCTER, JR.,
JOHN M. MAISCH,
CHARLES BULLOCK.
J. FARIS MOORE,
P. W. BEDFORD.

After some discussion in reference to the prize essays, the Report was unanimously adopted.

Owing to the hurried manner in which these Reports have necessarily to be produced during the sessions, the Chairman of the Business Committee moved that the Committee on questions for investigation be made a standing special Committee to report at the next meeting of the Association—which was adopted.

Edward Parrish here made some interesting remarks on the art of skeletonizing leaves, and its relation to the apothecary's business, and exhibited a beautiful case of bleached specimens called "the Phantom Bouquet."

On motion of the Business Committee it was ordered that all periodicals, papers, exchanges, etc., received by the officers or Executive Committee, be placed at the disposition of the Committee on the Progress of Pharmacy, for use in compiling their Report.

The following resolution was then passed:

Resolved, That the thanks of the Association are heartily tendered to the Philadelphia College of Pharmacy and the Pharmaceutists of Philadelphia, for the hospitality and kindness extended to the members of the Association during their visit to this city.

The Secretary then read the Minutes of all the sessions, which after amendment were adopted.

The Association then on motion adjourned, to meet, in accordance with the resolution previously adopted, on the second Tuesday of September, 1863, at such place as the President and the Executive Committee may determine upon.

P. W. BEDFORD, *Secretary*.

Editorial Department.

MEETING OF THE PHARMACEUTICAL ASSOCIATION.—Our readers will find at page 472 the Minutes of the late Meeting in this city, nearly in full, which we publish in anticipation of our November issue, in which number they usually appear. The meeting was small, the attendance, except from New York, being much below the usual ratio. This is chiefly due to the prospect of the military draft occurring on the 3d of September, the postponement not having taken place until too late for the members to reach Philadelphia. As it was, the States of Massachusetts, New York, New Jersey, Pennsylvania, Delaware, Ohio, and Illinois were represented. As the Minutes are full, we will not occupy further space than to say, that the meeting adjourned to meet again on the second Tuesday of September, 1863, the place being left to the decision of the President and Executive Committee.

NEW YORK COLLEGE OF PHARMACY.—At a stated meeting of the Board of Trustees of the College of Pharmacy, of the City of New York, held August 4th, 1862, the following Preamble and Resolutions were passed:

The Board of Trustees of the College of Pharmacy have received the melancholy intelligence of the death of Dr. Wm. H. Milnor, a respected member of this College, and for several terms its efficient Secretary; he having died at Savage's Station, Va., while serving his country in the capacity of surgeon to the Twenty-Second Regiment Massachusetts Volunteers. As evidence of our appreciation of his worth, and from respect to his memory, the Board have

Resolved, That in the death of our friend, though for many years separated from us, we feel the more strongly, because it is now final, the loss of his services, his fidelity to our institution, and his genial and intellectual society.

Resolved, That a copy of this preamble and resolution be presented to his family.

Copy from the Minutes. P. W. BEDFORD, *Secretary*.

Notes on Chinese Materia Medica. By Daniel Hanbury, Fellow of the Linnæan Society, &c. Reprinted from the Pharmaceutical Journal, London, 1862. Pp. 48.

This curious and well illustrated little volume has been received from the author, and will, on a future occasion, when we have space to do it justice, receive a further notice.

Proximate Analysis of Plants and Vegetable Substances. By Frederick Rochleder, M. D., Professor of Chemistry in the University of Prague. Philadelphia, 1862. Pp. 80, octavo.

The above work of Dr. Rochleder was originally published in Germany, at Wurzburg, by Stahel, in 1858.

In 1859, Mr. John M. Maisch, now Professor of Materia Medica and Pharmacy in the New York College of Pharmacy, made a translation, and offered it for publication in this city, but it was declined by the Publisher, owing to the limited number of persons by whom such a work is sought.

In May, 1860, the Editors of the *Pharmaceutical Journal*, of London, commenced the publication of a translation by Mr. William Bastick, Pharmaceutical Chemist of that city, in parts of a few pages, which continued with occasional interruption, until March, 1861. Notwithstanding this translation had several defects, it was determined to adopt it as a basis of a reprint, in parts, in the American Journal of Pharmacy, Mr. Maisch having, very liberally, agreed to carefully revise the pages, before they were submitted to the printer, by a comparison with the original text. Its publication commenced in that Journal in January, 1860, and was continued until September, 1862, with but one interruption. The work as here presented will be found to vary somewhat from the translation of Mr. Bastick, and it is believed has been rendered clearer.

The subject is exceedingly difficult to convey in the abstract way in which the Author has seen fit to present it, and involves a constant repetition of terms that might perhaps have been partially avoided, and rendered more interesting to the student, if he had adopted the plan of giving actual examples of proximate analysis.

The work is particularly recommended to students of pharmacy, who seek information in preparing their theses, and deserves a place in every chemical and pharmaceutical library. It is for sale by Charles Ellis & Co., 724 Market Street, Philadelphia. Price 60 cents, or post-paid 70 cts. when ordered by mail.

The Phantom Bouquet: a popular treatise on the art of skeletonizing leaves and seed-vessels, and adapting them to embellish the home of taste. By Edward Parrish, of Philadelphia, Member Acad. Nat. Science, &c., Philadelphia, J. B. Lippincott & Co., 1862. Pp. 47, 16mo.

This little volume is intended as a practical manual for those interested in the beautiful art of skeletonizing leaves. It is illustrated with several exquisite wood engravings. After general remarks on the structure of leaves and their relations to the tree or plant, in which the author considers the leaf as a type of the tree in its venation, he proceeds to tell us how and what to collect. The first and important process of maceration is then explained; other processes to meet particular cases then follow, including the natural process of skeletonizing by certain insects, as the "Caddice Worm." After

treating of leaves, seed-vessels and other parts are discussed. The bleaching of the skeletoned fabric of the leaves, etc., comes next, and on the perfection of this, much of the beauty of the "bouquet" depends; and lastly, the mounting or arrangement of the leaves in groups, or "bouquets," is taught. In passing we may venture the opinion that however successful may be the preparatory operations, upon this final disposition of the results depends the real success. Unlimited room for the display of a chaste and delicate taste is here afforded. The author very happily dedicates the volume to his best friend in the following words:—"To my Wife, a pioneer and proficient in the art herein portrayed, this work is affectionately inscribed." It is well printed, and altogether is a beautiful and acceptable addition to the literature of art.

The Physicians' Visiting List for 1863. Lindsay & Blakiston, Philada.

On presenting this little volume to a medical friend, he afterwards handed us the following opinion of its merits, based on a use of previous editions: "The Physicians' Visiting List, by Lindsay & Blakiston, answers every indication required. Being compact, well arranged, and at the same time having sufficient space allotted to the various parts, thus rendering it an invaluable companion of the Physician. Examining it carefully, and thinking over the arrangement of its different parts, I know of no alteration by which it could be improved. To the Physician, with the cares and anxieties of a large practice, it must be a wonderful economist of time and labor."

William H. Milnor, M. D.—The subject of this sketch was for many years a prominent druggist of New York City. He had previously been a practising physician, but relinquished his profession for one he hoped would prove more lucrative. While engaged in the drug business, he connected himself with the College of Pharmacy, which institution he served faithfully for several terms as its Secretary. Owing to the failing health of his wife, he removed to Richmond, Va., in hopes that she would be benefitted. He afterwards returned to New York, and had been living there and in this city till recently. Continued domestic sickness and the failure of his own health, had much harassed and burdened him. Some months since, he accepted the position of Assistant Surgeon to the Twenty-second Regiment Massachusetts Volunteers. Being left at Savage's Station, on the retreat of our forces to the James River, in charge of one hundred wounded men, his health and strength proved inadequate to the task. He gave himself with earnestness to these new duties, but the exposure and physical labor, combined with the limited allowance of food granted them by the rebel authorities, (who had taken them as prisoners,) was more than his weak nature could bear. On the morning of the 24th of July he had dressed an officer's wound, and soon afterward retired to his room for rest.

He was soon seized with a difficulty of respiration, and as his attendants raised him up he suddenly expired. He was buried under the shade of an apple tree, back of Savage's house. Those who knew him in business, will remember him as one who was eminently proficient and enthusiastic in his vocation. His more intimate friends will remember his general worth and consistent Christian character. His family will mourn him as a kind son, a loving husband, and an endeared parent. He leaves a widow and three children, who reside in this city. B.